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Executive summary

Introduction

The dairy sector makes a substantial contribution to the revenue earned by agriculture in the EU as a whole. More than one million dairy producers supply close to 150 million tonnes of milk annually. At the same time, the size and importance of the dairy sector varies considerably between MS and across regions due to agronomic, economic, historic and other factors. In addition, the milk processing industry employs a further 400 000 people. The total EU budget expenditure for the milk sector for 2008-2011 was on average €3,500 million.

The EU dairy market is regulated by the Common Market Organisation (CMO) for milk and milk products, consisting of the traditional instruments of the Common Agricultural Policy (CAP) (import duties, export refunds, and intervention stockholding for butter and skimmed milk powder). These measures are aimed at directly supporting dairy product prices, and hence indirectly the raw milk price and the incomes of dairy farmers. Alongside public intervention, the private sector's stockholding role has also been stimulated by measures including mandatory private storage aid for butter, and optional private storage aid for skimmed milk powder and cheese. Moreover, in order to stimulate final demand for dairy products, internal disposal aids for butter, cream and skim milk powder have been used.

In 2003, new and revised CAP measures for the dairy sector were adopted. The most radical component was the switch of some income support out of market prices into a direct payment for milk producers, known as the dairy premium. The aim of this reform was to bring dairy policy into line with measures already adopted in other sectors to replace price support with direct income payments, with the aim of promoting a more market-oriented and competitive agriculture. The reform of the measures for dairy was part of a larger, more comprehensive set of policy changes introducing a Single Payment Scheme (SPS) of decoupled income support, which combined several pre-existing direct payments into a single farm payment (SFP). The dairy premium was scheduled to be incorporated into the SFP between 2005 and 2007. The decoupled SFP is intended to maintain income support levels whilst allowing farmers more freedom to respond to market demand.

The new Member States had the option of applying a simplified decoupled support scheme, the Single Area Payment Scheme. They also had the possibility to grant additional support during the phasing-in period for the direct payments and subject to the approval by the Commission in the form of complementary national direct payments (CNDP).

Objective and scope

The objective of this retrospective evaluation is to analyse the economic and structural aspects of the EU dairy sector, and to assess the impacts of the CAP measures applied to this sector since the 2003 CAP reform. Therefore, the first policy changes to be evaluated are those enshrined in decisions legislated in 2003, or decided earlier, but not implemented until after 2003. The evaluation period begins on 1 July 2004, when the first cuts to intervention prices were implemented and the phasing-in of the dairy premium began. However, in order to capture the impacts of implementing the 2003 CAP reform, data from the pre-2004 period are used to establish a reference point or period. Most of the indicators on which the evaluation is based are reported up to 2009 or 2010, depending on data availability. Those based on farm accounting data from the EU-FADN data base extend up to 2007.

The report falls into two main parts. The first part, consisting of an extensive background chapter and eight chapters evaluating specific and concrete impacts of the policies is intended to establish a factual basis on which to base the evaluation of the effectiveness, efficiency and relevance of policy measures in relation to their objectives. The report is also required to identify possible unintended side-effects of the measures and their deadweight. The coherence of the new measures for dairy with the overall concept and principles of the 2003 CAP reform, and with rural development measures and state aids, is also assessed.

The geographical scope of the study covers the 27 Member States of the present European Union (EU-27). However, it must be borne in mind that ten of these Member State did not formally come under EU dairy policy until their accession in May 2004, and two of them (Bulgaria and Rumania) adopted the CAP only with their accession in 2007. Moreover, after joining the EU, the agricultural sectors of these 12 Member States were subject to various additional or differentiated transition measures as agreed in their accession terms. Furthermore, for some of the indicators, comparable data for the pre-2004 period are not available for these new Member States. Therefore, for some policy impact indicators, more weight is attached to evidence provided by the Member States of the EU in its 2003 borders (i.e. EU-15).

Approach and methodology

An important characteristic of the EU's dairy policy is its complexity and the inter-related nature of links between instruments, results and impacts. Policy measures often act on more than one objective and have intermediate impacts that contribute to more than one global objective. In addition, the policies under evaluation were introduced sequentially during the evaluation period, as successive legislation extended or reinforced measures already taken or at least already announced, in previous legislation. This makes the evaluation task more difficult than if it had to evaluate the impact of one single reform or legislative act, or a set of measures introduced at the same point in time. Apart from this, some impacts are themselves spread over time, not just because of the finite reaction time of the producers to the policy changes, but also because policy changes were themselves phased in over time, or implemented in different years by Member States.

The study follows a standard evaluation methodology, encompassing four phases:

- *Structuring*: detailed planning of the study, identification of sources, theoretical analysis of the policy measures applicable to dairy and their impact on production, demand, markets, and trade; development of questionnaires for producers and processors, empirical analysis of the sector; identification of judgement criteria and indicators to answer the evaluation questions; define and create the evaluation tools for answering the evaluation questions. This phase is based on an elaboration of the *intervention logic*.
- *Observing*: data collection by means of exploiting existing data sets and primary data gathering; carry out case studies, interviews and surveys. This phase comprises two main components: (a) an extensive descriptive chapter, based on official data sources, presents data on the evolution of the EU dairy sector and dairy markets in their international and policy contexts; (b) 11 case studies in 10 Member States, whose full results are not presented in this report, supplement the official statistics used to answer the evaluation questions with additional data and insights.
- *Analysing*: based upon the data collected, the analysis is organised around the 11 evaluation questions raised by the European Commission. The analysis is based on *empirical indicators*. These indicators are defined with the intention of verifying the impacts of the policy changes under evaluation, as predicted by the intervention logic. Indicators are calculated at EU level, at Member State or regional level, or for the average (dairy) farm, according to the type of impact that is being investigated and subject to data availability. A change in the level or trend of an indicator from 2004 onwards, compared with its level or trend in the preceding period, is *prima facie* evidence in favour of a policy impact. In some cases, this interpretation is beyond question. In other cases, because of the lack of a counterfactual that would enable a clearer attribution of changes to particular policy changes, and especially because of the exogenous disruptions occurring in dairy markets in the period 2007-2010, interpretation has to be more nuanced.
- *Judging and recommending*: evidence-based conclusions are drawn with respect to the performance of policy measures, both as a package and individually. Judgements are qualitative, based on the indicators and their interpretation. They are formally expressed as qualitative scores for each policy measure in relation to its target. The scores represent the consensus of the evaluation team and endorsed by other market experts. Recommendations are made based on lessons learned from the evaluation, relating achieved results to stated policy objectives.

Qualitative and quantitative tools

An economic theory framework was developed for the dairy sector, which describes and explains the basic mechanisms linking policy objectives, policy measures and their impacts. This framework depicts the dairy sector as a supply chain beginning with the primary production of raw milk by dairy farmers, followed by the processing of the raw milk into various dairy products by the processing sector, then domestic retailers and trading (export and import) companies, and lastly final consumers. The interfaces between the different stages of the supply chain consist of national and international markets.

Based on this theoretical framework and the intervention logic (see below), indicators intended to capture the specific impact of the measures to be evaluated were defined, taking into account the causality structures derived from the theoretical framework. These indicators were quantified using empirical data from the evaluation period and compared with their quantified benchmark values. A number of specific analytical tools were used to construct some of these indicators. More specifically:

- a market balance tool, which is used to identify imbalances (of protein and fat milk components, and of raw milk) taking into account the specific characteristics of raw milk and dairy products (fat, protein and other milk components),
- a measure of price support, which relies on the calculation of EU and world market equivalent raw milk prices, taking into account the linkage between raw milk and milk product prices (accounting for processing margin and quality differences),
- various price volatility indicators (e.g. price-bands, the coefficient of variation and the annualised standard deviation in order to assess volatility of milk and milk product prices,
- long-term trends in various dimensions of farm structure,
- a model based on the FADN data, which identifies revenue, cost, margin and income indicators related to dairy activities, the impacts of the policy on dairy farm income, in order to assess the income evolution in dairy relative to other sectors.

In addition, primary data tools were developed to recover information from producers, milk processors and policy makers and experts. More specifically:

- a producer questionnaire was drawn up containing questions related to each relevant evaluation question (e.g. milk price, payment system, quota, farm income, farm structure, the decision to continue or exit milk production, role of the direct payments and state aid).
- a milk processor survey was designed with questions related to those evaluations questions with links to the processing sector (e.g. response to changes in measures for public and private storage, export licenses, domestic aid programs, changes in structure and policy impacts on firm marketing strategy).
- an open question survey of policy makers was used to obtain information on policy implementation and state aid.
- open interviews with experts (e.g. market analysts, stakeholder organisations, farm extension providers) were used to obtain missing information, discuss trends and observations and improve background insights, as well as to cross-validate findings obtained from other sources.

Intervention Logic

As a preliminary step to interpreting the empirical evaluation questions and defining the indicators for addressing them, an intervention logic was developed which links measures and their impacts to the specified objectives, and aims to identify the expected effects of changes in policy measures. Establishing the intervention logic is a challenging task in the context of dairy policy, with its on-going policy agenda, steady stream of legislation and interlinked policy changes. For the measures agreed in the 2003 reform package, we consider that (although some were not implemented for 2 or 3 years) enough time has elapsed to allow a full ex post evaluation of the *intermediate impacts* (i.e. short- to medium-term impacts) based on empirical indicators. The *global impacts* are assessed in terms of the trends set in motion by these changes and whether they are likely to continue in the desired direction towards fulfilling the global objectives in the coming period. For later policy changes (in particular those of the 2008 Health Check package), it is too soon to attempt the same kind of evidence-based analysis even of the intermediate impacts.

The relevant legislation specifies the following policy objectives as the main guiding principles of the reforms to be evaluated:

- Improving market performance (market balance and market stability)
- Maintaining producer incomes
- Enhancing the competitiveness and market orientation of the sector
- Improving structures and facilitating structural change
- Policy simplification

- Promoting environmental standards and product quality

The intervention logic relates the policy measures to the specified objectives, and helps to identify the expected effects of changes in policy measures. The following new measures or changes in existing measures are covered:

- Milk quota system
- Quota management
- Direct payments to producers (dairy premium, additional payment for milk)
- Special payments by Member States (CNDP in New Member States)
- Decoupling of direct payments that were previously coupled to production
- Price targeting
- Public intervention measures for butter and skimmed milk powder
- Private storage aids for butter and cheese
- Consumption aids in the milk and milk products sector
- Butter, concentrated butter and cream disposal scheme
- Trade policy (export refunds, import duties, licence system, and tariff rate quotas)
- Article 69 of Reg. (EC) No. 1782/2003
- Cross compliance

The school milk programme is not included among the measures under evaluation, as a separate evaluation study for this measure is foreseen.

Information sources and their use

In order to build up the factual basis for the evaluation, the report relies on various sources of information:

- Statistical and accounting data: DG AGRI, DG BUDGET, Eurostat, Farm Accountancy Data Network (EU-FADN), the OECD PSE database, UN COMTRADE, the TARIC database, national/regional statistics, data collected from national and international institutes (Productschap Zuivel; IDF);
- Case studies conducted in 11 Member States/13 regions (South-West region of Ireland, North-east region of the Netherlands, Bavaria, Lower Saxony, West-France, Franche Comté, Upper Austria, Lombardy, Emilia Romagna, Galicia, Latvia, Podlaski, and UK), including interviews with the main stakeholders: national and Regional Authorities, professional organisations, farmers and processing industries;

With respect to the analysis based on EU-FADN data, the following choices have been made:

- The period of analysis is 2000-2007 (the latest year for which data for all EU Member States were available at the time when the work was done).
- The analysis focuses more particularly on specialist dairy farms (TF41, defined in the Commission's Farm Typology as farms earning at least two thirds of their standard gross margin from dairying). Where necessary to get an adequate representation of the dairy farms, this sample is supplemented by farms earning 50% or more of their standard gross margin from dairying.
- The cost and gross margin calculations are based on a cost allocation model, developed in the EU-FADN unit of the European Commission, and slightly adapted by the Von Thünen Institute in Braunschweig. Reallocation of costs to the dairy sector is based on different shares, i.e. share of milk in total output or share of dairy livestock units within total livestock units. The model only uses data from specialised dairy farms (TF 41), cattle dairying and rearing (TF 43), mixed livestock, mainly dairying (TF 71), and field crops and grazing livestock combined (TF 81).

Other methodological issues

As regards the analysis of market balance the approach used involved:

- defining the concept of structural excess supply based on the theoretical framework;

- calculating the structural excess supply of all components (fat, protein, other solids);
- converting components into milk equivalents by using the total solid method as developed by the IDF.

The analysis of the impact of policy measures applicable to the dairy sector for each evaluation question required specifying a benchmark against which the impact could be assessed. In order to do this, the following approach was followed:

- If an evaluation question focuses on a change or improvement (e.g. dairy farm incomes) the period preceding the start of the evaluation period (2003, or the period 2001-2003) is chosen as a benchmark.
- When in the pre-evaluation period variables already show a trend (e.g. structural change), a longer period before the observation period is used as a benchmark, in order to allow identification of changes in trends rather than levels of variables.
- In case of the price volatility analysis, price variability indicators for the period 2003-2010 are compared to indicators for the 7 year period preceding the evaluation period.
- Where appropriate, the pre- and post-reform periods are broken down into sub-periods in order to capture the timing of impacts.
- Because the period under review is a transition period (from price support to a coupled direct payment, which is then decoupled), certain indicators (such as income support, or budget cost) are calculated both with and without including decoupled payments.
- In order to separate out the impact of reform from other exogenous developments in the efficiency analysis, a counterfactual is constructed that removes the impact of the demand surges for commodities on the world market, which played a dominant role during the period 2007-2009 and tended to overshadow the effects of EU policies on internal markets.

Limitations of the analysis

Some of the limitations of the analysis that should be taken into account when interpreting the results are:

- The period 2007-2009 was characterised by severe disruption of internal EU markets, which originated in world commodity markets. The sharp spike in dairy prices dominates price movements, and overshadows any price impacts that may have been triggered by EU dairy policy changes. ‘Noise’ caused by exogenous factors that cannot be removed from the observations made in real time can cause the analysis to be inconclusive. Another example encountered in this report concerns the ten New Member States that entered the EU in 2004. The evolution of their dairy sectors was strongly marked by their adjustment to the CAP and more generally their acceptance of the Single Market. It is often impossible to separate out the impacts of specific dairy policy changes from the more powerful trends set in motion by these accession processes.
- These extreme cases illustrate a general problem encountered when conducting an indicator-based assessment, as in this evaluation. Without being able to compare actual outcomes with a true counterfactual scenario, in which all factors except the policy change to be assessed are reproduced but with the policy remaining unchanged, one must be cautious when interpreting changes in an indicator as an impact of the policy change, or as caused solely by the policy change.
- In some cases, it has been impossible to reach conclusions encompassing all Member States because of missing data in some statistical collections, or for some variables or time periods. For example, this holds for Bulgaria and Romania, which entered the EU in 2009, and to a much lesser extent also for the Member States that entered the EU in 2004.
- Problems of data availability were also encountered in specific areas addressed by the analysis. With respect to state aid it has been very difficult to obtain information, whether from the Commission or from organisations in Member States. Because of this lack, the completeness of the analysis done on this item cannot be guaranteed. Other areas where data were difficult or impossible to obtain data involve particular products (adequate market data on cream and drinking milk) and public administration costs (obtained from only two Member States, and calculated according to different methodologies, which renders them non-comparable).

- The surveys are performed with relatively small and non-representative samples. Care should be used when drawing conclusions about the population of EU milk producers from the survey results, in particular when answers to a certain question strongly diverge over respondents. However, the information obtained from this source sheds light on a number of issues not covered in the official statistical collections, and can supplement the latter as an information source.
- The response rate to the processor survey was particularly low, in spite of repeated efforts to increase participation. Moreover, processors may have behaved strategically in answering a number of questions, perhaps because they found certain information too sensitive to share with outsiders.

The Evaluation Questions

The analysis is structured according to the eleven evaluation questions set out below. The approach chosen is to show to what extent dairy policies (as a package) have affected each particular outcome, as well as to indicate what role has been played particularly by specific instruments. The first eight questions seek to establish a clear picture of how the policy-relevant aspects of the sector have evolved since 2003, and to verify the link between the trends identified and policy measures. The last three questions focus on the implications for these findings according to more abstract criteria that permit an overall multidimensional judgement to be formed.

The main findings are very briefly indicated and further explained in the text below.

Overview of Evaluation Questions (EQs) and main findings

EQ	Short description of key question	Main findings with keywords
1 Production and supply to / demand by dairies	To what extent have the CAP measures applicable to the dairy sector contributed to balancing supply and demand of milk and led to production restructuring?	• Domestic supply became less determined by quota ceilings and more responsive to milk prices, with quota no longer being always filled for most Member States • The shift of income support from market price to direct payments, reduced intervention for butter and SMP, and the abolition of the target price for milk led to a falling structural excess supply (from 2004 onwards) and contributed positively to balancing demand and supply • Structural changes affecting the number of dairy cows and herds, the herd-size distribution and extent of specialisation of farms in milk production have continued, but they cannot be linked to specific CAP measures studied here • Higher national quota ceilings led to greater geographic mobility of productive capacity in some Member States

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EQ	Short description of key question	Main findings with keywords
2 Producer prices	To what extent have the CAP measures applicable to the dairy sector affected prices paid to producers, the payment system and price stability?	• The abolition of the target price for milk, reduction in intervention prices for butter and skim milk powder, the scaling down of consumption aids and relaxation of quota ceilings led to a reduction in commodity (and hence milk) prices and gradual convergence of the EU towards world market prices during 2004-2006 • The case study surveys suggest that the changes in CAP measures did not affect the milk payment system • In 2007-2009, the effects of the CAP measures on internal prices were masked by the price turbulence originating in the world market commodity boom • During 2007-8, which was a period of abnormally high world market prices, export refunds and intervention buying were no longer operational during the months when the world prices exceeded the intervention price levels • In 2009, on the downside of the price spike, although intervention buying-in was activated, the (average) EU-27 raw milk price fell to below €25/100 kg in June and July
3 Producer's income	To what extent have the CAP measures applicable to the dairy sector contributed to maintaining / increasing the farmers' income?	▪ Trends in dairy farm income, measured by FNVA/AWU, was maintained ▪ The profitability of dairying relative to other commodity sectors was maintained ▪ Maintenance of dairy incomes despite lower institutional prices is largely due to the role of direct payments ▪ Structural change (farm size expansion) was also a positive factor contributing to dairy farmers' income
4 Producer's competitiveness and market orientation	To what extent have the CAP measures applicable to the dairy sector contributed to increasing farmers' market orientation and competitiveness?	▪ Market orientation improved due a reduction in the price gap between the EU and world markets, weaker quota constraints and hence stronger supply response to price signals ▪ Cost-competitiveness did not improve, and the share of milk from 'profitable' milk enterprises declined after 2003 until the sharp price increase in 2007
5 Prices of milk products	To what extent have the CAP measures applicable to the dairy sector contributed to stabilising the market prices for milk products?	▪ EU dairy product prices remained stable until 2006 due to export refunds and public intervention ▪ Volatility increased after 2007 due to a commodity boom on world markets

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EQ	Short description of key question	Main findings with keywords
6 Market balance	To what extent have the CAP measures applicable to the dairy sector contributed to balancing supply and demand for milk products?	▪ Structural excess supply declined for the main dairy products after 2003 ▪ The main factor driving these falls was an increase in unsubsidised demand ▪ Because of the absence of lower product prices (apart from weak evidence regarding butter), only a limited impact of policy changes could be identified
7 Structure of processing industry	To what extent have the CAP measures applicable to the dairy sector influenced structural changes in the processing sector?	▪ No strong conclusions could be drawn with respect to policy impacts ▪ Concentration and consolidation of firms increased in some Member States
8 Competitive-ness on international markets	To what extent have the CAP measures applicable to the dairy sector contributed to improved competitiveness of milk products on international markets?	▪ Price gap relative to the world market declined due to lower intervention prices for butter and SMP, and increasing world market prices ▪ The volume of unsubsidised exports of cheese increased (this holds in particular for quality and PDO/PDI cheeses) ▪ During the evaluation period, the EU was not competitive at world market prices for all products, but for some products its competitiveness has improved
9 Efficiency	To what extent have the CAP measures applied to the dairy sector been efficient with respect to their objectives?	▪ Efficiency has generally increased ▪ The total cost of dairy support policy declined whilst market balance improved and producer income levels were maintained ▪ Market orientation and sector structure improved without any related increase in policy costs ▪ There was no marked change in the competitiveness of milk or dairy products ▪ Dairy production became more sustainable but at an additional cost ▪ Price stability deteriorated, largely due to external factors, whereas costs of intervention and export refunds declined
10.1 Coherence - Rural Development Programmes	To what extent have the CAP measures applicable to the dairy sector been coherent with the rural development measures and the national aid granted in accordance with relevant EU rules stated?	▪ Good degree of coherence between the CAP dairy measures, and rural development measures and state aids ▪ Pillar 1, RDP and national aid measures operate at different levels and scales, giving them a complementary character ▪ Several synergies and one source of potential conflict between CAP dairy measures and RDP objectives were identified

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EQ	Short description of key question	Main findings with keywords
10.2 Coherence – Overall CAP objectives	To what extent have the CAP measures applicable to the dairy sector been coherent with the overall concepts and principles of the 2003 reform of the CAP?	▪ A high degree of coherence was found ex post ▪ Market orientation and competitiveness improved to an extent ▪ Income support was maintained at pre-2003 levels and income trends continued unchanged post-2003 ▪ Environmental sustainability increased ▪ Socio-economic sustainability in question due to a fall in the rate of entry of young dairy farmers
11 Relevance	To what extent have the CAP measures applicable to the dairy sector been relevant with respect to the needs and problems of farmers, processors and consumers?	▪ Milk producers' concerns over income, production flexibility and expansion are met, but at the cost of a heavier administrative burden and more exposure to price risk ▪ Processors also face more price and market risk ▪ Society benefits from increased efficiency, and more focus on environmental sustainability ▪ Consumers face potentially lower product prices, but this benefit is conditional on the transmission lower milk prices along the supply chain

The effectiveness of individual instruments

The main findings with respect to the evaluation questions assume that the potential link between individual policy instruments and targeted outcomes has been activated. These findings can be structured explicitly in terms of the effectiveness of each instrument, taking account of the fact that many of the measures influence – directly or indirectly – more than one of the policy objectives.

The following table provides an overview of the effectiveness with which particular instruments were deployed over the period 2004-2010.

Summary of Instrument Effectiveness

Instruments	Expected effects	Evidence	Success (scale 0 - √√√)
Milk quota system and modifications to it	Market balance	EQ1a	√√√
	Greater confidence for processors (stability of supply, investment decisions etc)	EQ7	√√
	Relaxation of quota limits improves market orientation	EQ4	√
	Average score[1]		**√√**
	Unintended side-effects Impedes structural change Creates winners and losers from quota trading in periods of policy transition	Investigated in EQ1b Investigated in EQ9	Not found Some evidence found
Public intervention measures for butter and skimmed milk powder and changes thereto	Use of intervention stocking → milk price stabilisation	EQ2	√√ (as long as intervention prices are higher than world market prices for butter and SMP *and* there is good price transmission from processors to producers)
	Use of intervention stocking → dairy product price stabilisation	EQ5	√√ (as long as intervention prices are higher than world market prices for butter and SMP)
	Lower intervention prices → lower milk price	EQ2	√√√
	Lower milk price → reduction of structural surplus	EQ1, EQ6	√√√
	Lower milk price → improvement in international competitiveness	EQ4, EQ8	√
	Average score		**√√**
	Unintended consequence Lower safety-net increases the probability of periods of high volatility transmission from world market to domestic prices	EQ2, EQ5, EQ9	Strong evidence found
Mandatory and optional aid for private storage for butter, skimmed milk powder and cheese	Private storage → market stabilisation	EQ4, EQ5	0
	Deadweight Impacts would have happened anyway	EQ9	Evidence found
Disposal aids for butter and cream, SMP (manufacturing, persons, animal feed)	Well targeted to disposing of the surplus?	EQ1, EQ6, EQ9	√√

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Instruments	Expected effects	Evidence	Success (scale 0 - √√√)
Licence system, tariff rate quotas, import duties and export refunds	Export refunds as disposal mechanism for surpluses	EQ1a, EQ6	√√√
	Export refunds as an instrument for price stabilisation of Dairy products Raw milk	EQ2, EQ5	√√√ (as long as intervention prices are higher than world market prices for butter and SMP *and* (for raw milk) there is good price transmission from processors to producers)
	Tariffs and tariff rate quotas as a precondition for maintaining higher domestic price	EQ2	√√√
	Export refunds as means of improving international competitiveness	EQ4	√√
	Export refunds as a price stabilising mechanism	EQ2, EQ5	√√√ (providing domestic prices are above world market prices)
	Average score		**√√**
Single Payment Scheme (SPS) and Single Area Payment Scheme (SAPS) (with respect to beneficiaries in the dairy sector)	Effectiveness in maintaining producers incomes despite the lowering of the milk price	EQ3, EQ9	√√√
Dairy premium and additional payment	Effectiveness in compensating producers for the milk price reduction	EQ9	√√√
	Effect on structural change and the exit rate	EQ1b	√ (not included in the average score)
	Improved market orientation	EQ4	√
	Average score		**√√**
Additional payments granted in the framework of Art. 69 of Council Regulation 1782/2003 and Art. 68 of Council Regulation 73/2009	Allocation by MS to the dairy sector	EQ10	Art 69 (only one MS), Art 68 (two MS)
	Uptake by producers	EQ10	Partial evidence of strong uptake
	Effectiveness in attaining specific objectives at MS level		Not assessed

1. The 'average score' is a subjective assessment based on the distribution of the scores reported for each objective of the corresponding instrument.

Relevance of the policies

The underlying aim of economic policy intervention is to modify the functioning of the economy or a sector of the economy so as to induce outcomes that are more beneficial or desirable to the main stakeholder groups. The relevance of a policy depends on the extent to which it meets the needs and concerns of the main stakeholder groups, and this aspect of CAP dairy policy has also been assessed.

It is of interest to summarise the relevance of certain blocks or clusters of instruments that have an impact on particular stakeholder concerns (even if they impact on more than one concern and/or more than one stakeholder group). The summary based on this approach is reproduced in the following table.

Summary of the relevance of policy changes

	Stakeholder Group			
Policy change	**Milk producers**	**Processors**	**Consumers**	**Society**
Package of changes involved in switching from market price support to a decoupled payment (including lower prices and more visible support through budget payments)	+++ (income levels maintained) ++ (more flexible production choices without losing support entitlement)	+ (lower prices for raw milk, but also potentially lower prices for processed products)	+ (potentially lower prices, BUT receiving them depends on price transmission along the chain)	+++ (the package is more efficient) - (cost becomes more visible as a budget item and hence needs to be properly explained)
Introduction of cross compliance requirements for milk producers	- - (investment costs, greater administrative burden)	0	0	++ (makes dairying more environment-ally friendly, helps to gain support for the CAP among the wider public)
Gradual increase and then abolition of quotas	++ (more scope for expansion, scale economies)	+ (more abundant milk supplies)	0	+/- (fear of negative environmental consequences, disappearance of dairy farming in mountain areas/ family farms)
Reduction of intervention to a safety net	- - (greater risk of price instability)	- (greater risk of price instability)	0	+ (large intervention stocks often seen negatively by society)
Simplification of policies	- Milk producers perceive greater complexity rather than simplification	+ (depends on the type of activities of the company)	0	+/- Difficult to obtain a balanced picture, more transparency needed

Recommendations

It is assumed the EU will continue to pursue the same policy objectives as those that motivated the policy changes reviewed, and to maintain those measures that were found to have had some success in promoting these objectives. The recommendations made below are based on conclusions drawn from this evaluation regarding gaps or inadequacies in the current set of policy measures.

1. In a rapidly changing global market context with shocks potentially occurring in any period of the year, intervention price levels, buying-in periods and ceilings set some years previously in a multi-annual framework and on the assumption of internally generated (seasonal) price movements are not necessarily able to provide an effective year-round safety net. In order to operate a safety net that is relevant for a more market-oriented sector facing greater exogenously produced price volatility, a more flexible safety net is required. **To this end, we recommend the adoption of more flexible intervention mechanisms so that they can respond more quickly** *at any time of the year* **to sharp falls in market price reaching abnormally low levels.**

2. Under the reformed CAP, the probability of fluctuating prices has significantly increased. Price volatility above a certain level creates uncertainty in the market, which inhibits investment, and hampers market orientation, as farmers can no longer appropriately distinguish 'noise' from changes in underlying market fundamentals. **Therefore, it is recommended that private or public risk management tools for farmers (individually or collectively) are facilitated and/or developed that aim to enable farmers to cope with higher levels of market price volatility, so as to counteract its negative effects on sector performance.**

3. The effective operation of the EU's dairy policy with respect to its objectives relies heavily on backward price transmission in the dairy supply chain. A better balance of market power between the various actors along the supply chain, particularly between milk producers and processors, is likely to become more important with the abolition of the quota scheme. **Therefore, it is recommended that the available options for redressing power imbalances in bargaining power be actively studied.** To counteract market power imbalances, several options can be envisaged. They include creating countervailing power (within the limits allowed by competition policy), legislating for more competitive behaviour in the price formation process within the chain, or restricting the build-up of market power concentration at local and national level downstream in the supply chain using new legislation to safeguard competition in the vertical dimension.

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List of Abbreviations

Abbreviation	Explanation
ASD	Annualised Standard Deviation
Assoc.	Association
AWU	Annual Work Unit
CAP	Common Agricultural Policy
CMO	Common Market Organisation
CNDP	Complementary national direct payment
CNIEL	Centre National Interprofessionel de l'Economie Laitière
CRIEL	Centre Régional Interprofessionel de l'Economie laitière
CR	Concentration ratio
CV	Coefficient of variation
D	Demand
DG AGRI	Directorate-General Agriculture and Rural Development
DG BUDG	Directorate-General for Budget
DP	Dairy premium
EAGGF	European Agricultural Guidance and Guarantee Fund
EEC	European (Economic) Community
EQ	Evaluation question
EU	European Union
EU-27	European Union, 27 Member States
EU-25	European Union, 25 Member States (prior to the accession of Bulgaria and Romania)
EU-15	European Union, 15 Member States (prior to the accession of EU-12)
EU-12	European Union, 12 Member States: Bulgaria, Czech Republic, Cyprus, Estonia, Hungary, Malta, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia
EU-10	European Union, 10 Member States: Czech Republic, Cyprus, Estonia, Hungary, Malta, Latvia, Lithuania, Poland, Slovakia, Slovenia
EU-02	European Union, 2 Member States: Bulgaria and Romania
EU-FADN	European Union Farm Accountancy Data Network
FAO	Food and Agriculture Organisation of the United Nations
FFI	Farm family income
FNVA	Farm net value added
FOB	Free on board
FSS	Farm Structure Survey
FWU	Family Work Unit
GMO	Genetically modified organism
IDF	International Dairy Federation
IFCN	International Farm Cost Network
IMPE	Intervention milk price equivalent
Inc.	Incorporated
kg	kilogramme
LFA	Less Favoured Area
MPS	Market Price Support
MS	Member State
OECD	Organisation for Economic Cooperation and Development
PMPE	Producer milk price equivalent
PSE	Producer Support Estimate
P-SUP	Price support ratio
RDP	Rural Development Programme
RDR	Rural Development Regulation
Reg	Regulation
S	Supply

SD	Standard deviation
SES	Structural Excess Supply
SFP	Single Farm Payment
SMP	Skim milk powder
t	metric tonne
TF	Type of farm
TRQ	Tariff rate quota
UK	United Kingdom
URA	Uruguay Round Agreement
USA	United States of America
USDA	United States of America Department of Agriculture
VES	Variable export subsidy
WMP	Whole milk powder
WMPE	World milk price equivalent
WTO	World Trade Organisation

1 Introduction

Following the implementing rules of the Financial Regulation applicable to the general budget of the European Union (Council Regulation (EC) No 1605/2002), all measures causing budgetary expenditure must have their results evaluated every six years. The Commission's Directorate-General for Agriculture and Rural Development is in charge of the regular evaluation of agricultural policy measures.

The Common Market Organisation (CMO) measures for dairy were last evaluated in 2002. The environmental aspects of the CAP measures related to the beef and milk sectors, and to the implementation of milk quotas by Member States, were studied in 2007 and in 2008, respectively. The DG AGRI multi-annual evaluation plan 2010-2012 provides for an evaluation of CAP measures applied to the dairy sector to be carried out in 2010.

The objective of this retrospective evaluation is to analyse the economic and structural aspects of the sector, and to assess the impacts of the CAP measures applied to this sector since the 2003 CAP reform. Therefore, the first policy changes to be evaluated are those enshrined in decisions legislated in 2003, or – in a few cases – decided earlier, but not implemented until after 2003. The evaluation period begins on 1 July 2004, when first cuts to intervention prices were implemented. However, in order to capture the impacts of implementing the 2003 CAP reform, data from the previous period are used to establish a reference point.

The evaluation is intended to examine the effectiveness, efficiency and relevance of policy measures in relation to their objectives. The evaluation will also assess possible unintended side-effects of the measures and their deadweight. The coherence of the new measures for dairy with the overall concept and principles of the 2003 CAP reform, and with rural development measures are also to be assessed. The coherence of measures financed by state aid with the new dairy measures is also within the scope of the assessment.

This report presents the answers to the Evaluation Questions of Theme 1, 2 and 3:

Theme	**Evaluation issue**	**Short description of key question**
1 Raw Milk	1 Production and supply to / demand by dairies	To what extent have the CAP measures applicable to the dairy sector contributed to balancing supply and demand of milk and led to production restructuring?
	2 Producer prices	To what extent have the CAP measures applicable to the dairy sector affected prices paid to producers, the payment system and price stability?
	3 Producer's income	To what extent have the CAP measures applicable to the dairy sector contributed to maintaining / increasing the farmers' income?
	4 Producer's competitiveness and market orientation	To what extent have the CAP measures applicable to the dairy sector contributed to increasing farmers' market orientation and competitiveness?
2 Milk products	5 Prices of milk products	To what extent have the CAP measures applicable to the dairy sector contributed to stabilising the market prices for milk products?
	6 Market balance	To what extent have the CAP measures applicable to the dairy sector contributed to balancing supply and demand for milk products?
	7 Structure of processing industry	To what extent have the CAP measures applicable to the dairy sector influenced structural changes in the processing sector?
	8 Competitiveness on international markets	To what extent have the CAP measures applicable to the dairy sector contributed to improved competitiveness of milk products on international markets?

Theme	Evaluation issue	Short description of key question
3 Efficiency, coherence and relevance	9 Efficiency	To what extent have the CAP measures applied to the dairy sector been efficient with respect to their objectives?
	10a Coherence - Rural Development Programmes	To what extent have the CAP measures applicable to the dairy sector been coherent with the rural development measures and the national aid granted in accordance with relevant EU rules stated?
	10b Coherence – Overall CAP	To what extent have the CAP measures applicable to the dairy sector been coherent with the overall concepts and principles of the 2003 reform of the CAP?
	11 Relevance	To what extent have the CAP measures applicable to the dairy sector been relevant with respect to the needs and problems of farmers, processors and consumers?

The rest of the report is organised as follows:

The second chapter describes the dairy sector in the EU and places it in the world markets. The third chapter describes EU dairy policy and focuses on the reform of the CAP dairy policies after 2003, which are subject to the present evaluation. It discusses what the objectives of the policies are and explains the benchmark followed in answering the evaluation questions. The fourth chapter analyses the theoretical effects of the presented CAP dairy policies. Chapters 5 to 15 answer each of the evaluation questions respectively. Finally chapter 16 concludes.

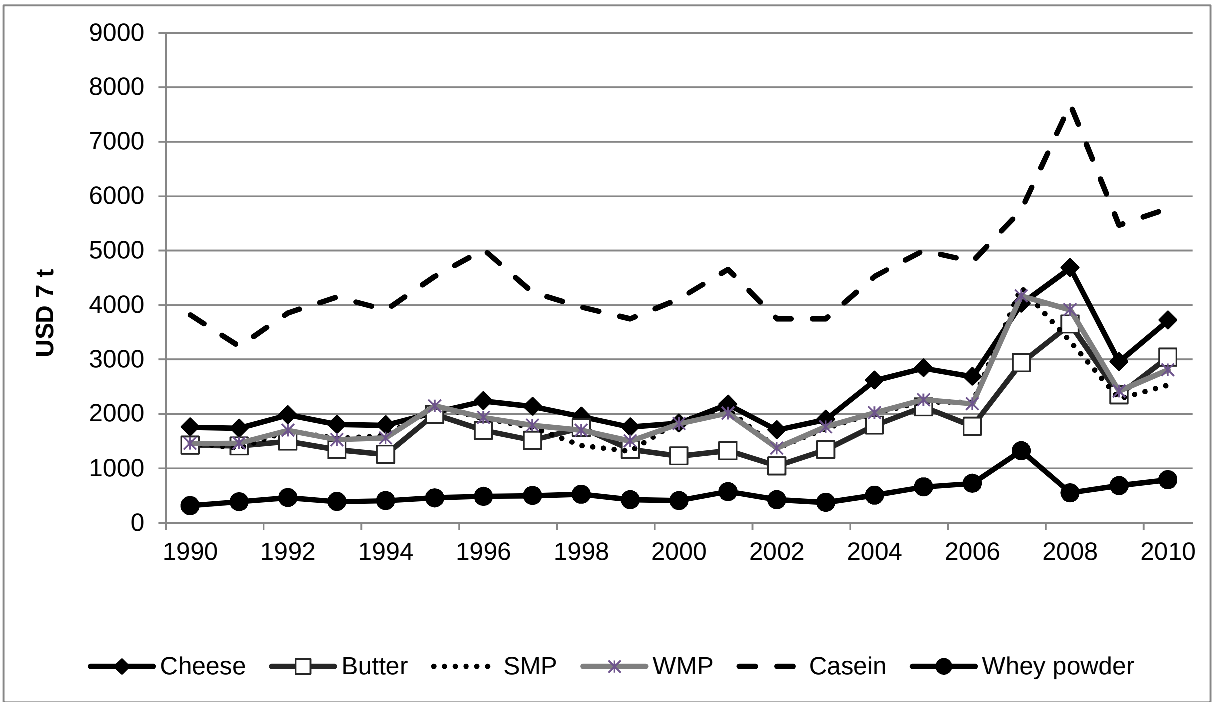
2 EU dairy sector

2.1 Dairy production in the world perspective

2.1.1 World market prices

Figure 2.1 shows the longer-run evolution of world market prices for key dairy products. Over the period 1990-2004, there were no strong variations in world dairy product prices. Thereafter, there seems to be a tendency for prices to increase. The period 2006-2010 was particularly turbulent, with prices for dairy commodities reaching very high levels in 2007 and declining gradually in 2008 and early 2009. These price movements caused severe disruption on milk markets in the EU and worldwide. Prices recovered partly in 2010, but the year was marked by further imbalances on world dairy markets (caused by events like food safety concerns in China for milk powders, limited supply in Oceania, and stronger demand in Russia and south east Asian countries). A number of factors contributed to the 2007 price peak, such as supply shortfalls linked to extreme weather conditions, high input costs, overall economic crisis and policy-driven trade limitations. While these developments fuelled discussions about food security, there is still little consensus on which factors affected food markets and to what extent (see for example Baffes and Haniotis, 2010; FAO, 2010; von Braun, 2008).

Figure 2.1 Medium-term evolution of world market prices for selected dairy products



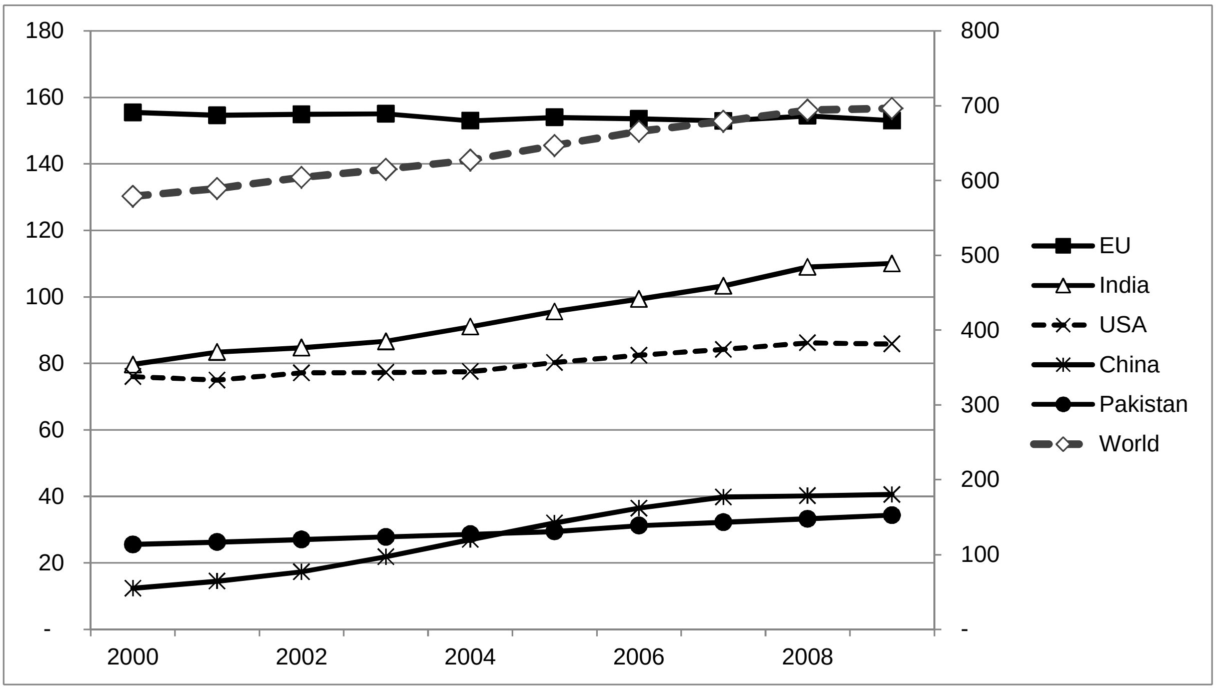
Notes:
Prices refer to:
SMP: FOB export price, non-fat dry milk, 1.25% butterfat, Oceania.
WMP: FOB export price, WMP 26% butterfat, Oceania
Butter: FOB export price, butter, 82% butterfat, Oceania.
Cheese: FOB export price, cheddar cheese, 39% moisture, Oceania.
Casein: Export price, New Zealand.
Whey powder: Edible dry whey, Wisconsin, plant

Source: OECD-FAO, 2011.

2.1.2 World production

World milk production increased steadily between 2000 and 2009 from 578.8 to 696.6 million t (average annual growth of 1.87% p.a.). The largest global milk producer is the EU, followed by India and the USA; either China or Pakistan have been in fourth place over the period 2000-2009 (Figure 2.2).

Figure 2.2 Milk production of largest producers (left axis) and the world (right axis) in 2000-2009 (million tonnes; all milk-producing animal types)



Source: FAOSTAT.

In 2009, the shares of world milk production by animal type were: cows 83.09%, buffaloes 13.12%, sheep 1.32%, goats 2.21% and camels 0.26%. The EU share of world milk production in 2009 was 21.69% (Germany 3.98% and France 3.45%). The other producers with more than 2% of world milk production each were India (15.97%), USA (12.23%), China (5.69%). Pakistan (4.89%), Russian Federation (4.64%), Brazil (4.17%) and New Zealand (2.19%). In the period 2000 to 2009, total milk production in India and in China grew at average rates of 3.13% and 12.09% p.a., respectively; China's milk output increased by 227% over this period. In the EU, by contrast, output decreased by 1.6% over the same period, but the total volume produced in 2008 (153.0 million t) was 278% greater than that of China (40.5 million t), a difference of 112.5 million t. Table 2.1 reports more details.[1]

Cows' milk, although the predominant type of milk globally, is not the only important type of milk at national level in some countries. More than half the total milk production of India (56%) and Pakistan (63%) is buffaloes' milk; China (8%) and Italy (2%) are also significant producers of buffaloes' milk. Italy and Turkey have significant shares of sheep milk (5% and 6%, respectively, of national production), followed by China (3%). As for goats' milk, India has the largest share in terms of national output (4%), followed by France, Pakistan, Mexico, Ukraine and Argentina.

[1] Empty cells in the tables throughout the report denote non available data.

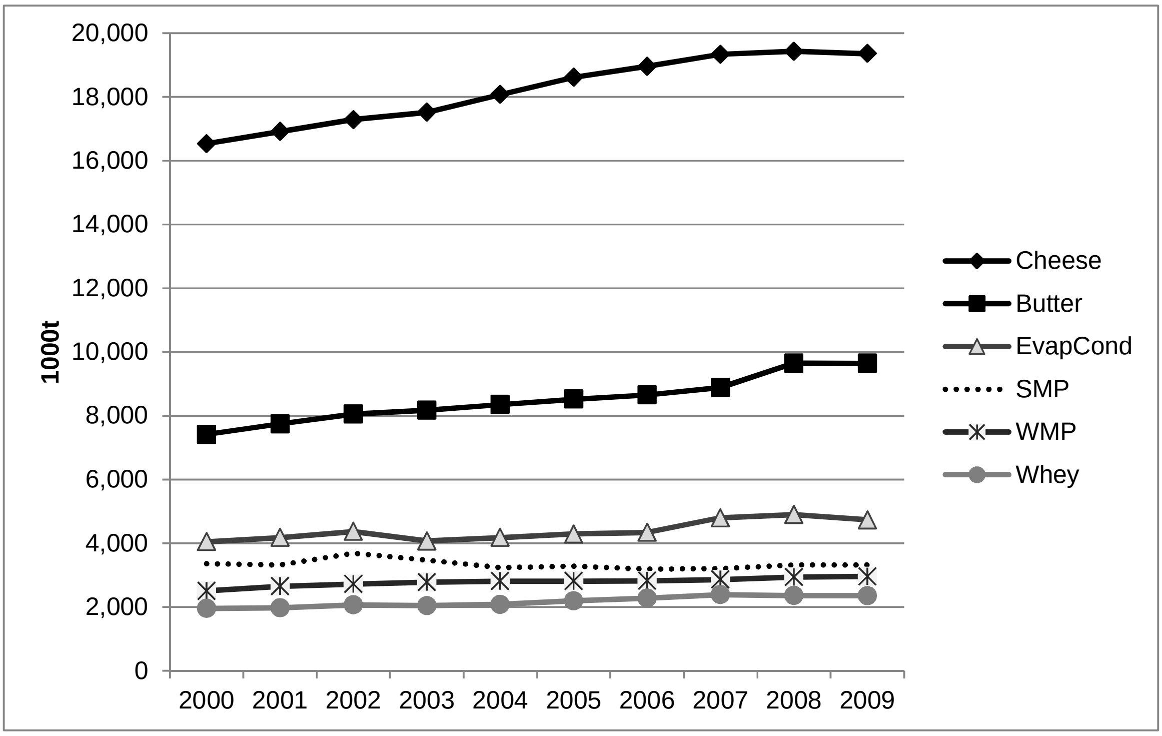
Table 2.1 Milk production in 2009 for world, EU and selected countries, totals in tonnes and shares by animal type

Regions/Countries	Milk Total	Share of world total		Share of national total by animal type				
		All milk	Cows' milk	Cow	Buffalo	Sheep	Goat	Camel
	1000 t	per cent	per cent	per cent	per cent	per cent	per cent	per cent
World	702,137	100.0	83.1	83.1	13.1	1.3	2.2	0.3
EU-27	152,260	21.7	21.0	96.7	0.1	1.9	1.2	0.0
EU-25	145,219	20.7	20.1	97.1	0.1	1.6	1.2	0.0
EU-15	123,054	17.5	16.9	96.6	0.2	1.8	1.4	0.0
EU-10	22,165	3.2	3.1	99.5	0.0	0.2	0.3	0.0
EU-02	7,041	1.0	0.9	89.2	0.1	9.8	0.9	0.0
Germany	27,972	4.0	4.0	99.9	0.0	0.0	0.1	0.0
France	24,218	3.5	3.3	96.4	0.0	1.1	2.6	0.0
United Kingdom	13,237	1.9	1.9	100.0	0.0	0.0	0.0	0.0
Poland	12,467	1.8	1.8	99.8	0.0	0.0	0.2	0.0
Italy	13,063	1.9	1.7	93.5	1.6	4.6	0.3	0.0
Netherlands	11,469	1.6	1.6	100.0	0.0	0.0	0.0	0.0
India	112,114	16.0	6.4	40.3	56.1	0.0	3.7	0.0
USA	85,859	12.2	12.2	100.0	0.0	0.0	0.0	0.0
China	39,946	5.7	5.1	88.9	7.5	2.9	0.7	0.0
Pakistan	34,362	4.9	1.7	34.9	62.9	0.1	2.1	0.0
Russian Federation	32,562	4.6	4.6	99.3	0.0	0.0	0.7	0.0
Brazil	29,256	4.2	4.2	99.5	0.0	0.0	0.5	0.0
New Zealand	15,400	2.2	2.2	100.0	0.0	0.0	0.0	0.0
Turkey	12,542	1.8	1.7	92.4	0.3	5.9	1.5	0.0
Ukraine	11,610	1.7	1.6	97.9	0.0	0.2	1.9	0.0
Mexico	10,719	1.5	1.5	98.4	0.0	0.0	1.6	0.0
Argentina	10,366	1.5	1.5	100.0	0.0	0.0	0.0	0.0
Australia	9,388	1.3	1.3	100.0	0.0	0.0	0.0	0.0
Canada	8,213	1.2	1.2	100.0	0.0	0.0	0.0	0.0
Japan	7,909	1.1	1.1	100.0	0.0	0.0	0.0	0.0

Source: FAOSTAT.

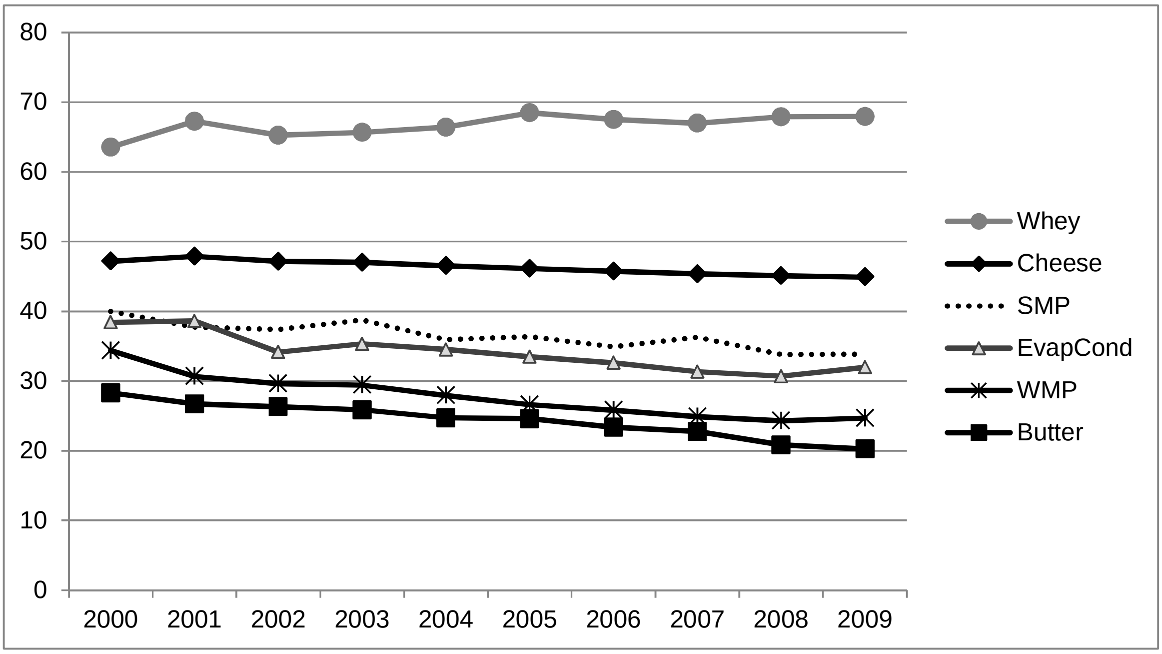
World production of all the major milk products except skim milk powder increased between 2000 and 2009 (Figure 2.3). Butter production grew by 30%, with India increasing its production by 86%, Pakistan by 28% and the USA by 25%. EU production fell by 7%. Cheese production rose by 17% over this period, led by the USA (21%) and the EU (11%). Whole milk powder (WMP) production increased by 18%, but EU production fell by 15%; by contrast, Brazil's production doubled and that of New Zealand grew by 45%. Skim milk powder (including buttermilk powder) production decreased by 1% globally and by 16% in the EU, although production in the USA increased by 28%. World production of evaporated and condensed milk grew by 17% (29% in the USA), whereas EU production decreased by 3%. Global whey (powder) production grew by 21%, and by 29% in the EU.

Figure 2.3 Evolution of world production of dairy products, 2000-2009



Source: FAOSTAT.

Figure 2.4 EU production of milk products as a share (%) of world production, 2000-2009



Source: FAOSTAT.

The distribution of the of world production of milk and dairy products in 2009 is shown in Table 2.2 and the share of the EU production of milk products in world production is shown in Figure 2.4.

The EU was the largest producer of all the main milk products except butter (including ghee) in 2009, for which India had the largest output. The EU produced almost twice as much cheese as the USA, with Germany and France being the second and third largest world individual country producers. France was the world leader for whey production, for which the EU as a whole produced over two thirds of global output. World production of SMP, WMP and evaporated and condensed milk was not as concentrated as for butter, cheese and whey. The EU was the largest global producer for these products also, but with lower shares of world production (34, 24 and 32% respectively). Other important producers of SMP were USA (25%) and New Zealand (9%), while France and Germany were the largest producers among EU Member States (with 8.6% and 7.0% of world production, respectively). For WMP, New Zealand and Brazil were the second and third most important producers, whereas the USA was by far the second most important producer of evaporated and condensed milk.

Table 2.2 World production and production shares of milk and dairy products in 2009 for the EU and selected countries

Regions/Countries	Milk	Butter (including ghee)	Cheese	Whole milk powder	Skim & butter-milk powder	Evaporated & condensed milk	Whey powder
World (1000 t)	702,137	9,968	20,051	2,915	3,288	4,765	2,384
			Share of world production, per cent				
EU-27	21.7	19.3	43.6	25.3	34.2	31.8	67.5
EU-25	20.7	19.2	42.7	25.3	33.9	31.8	67.5
EU-15	17.5	16.5	37.5	22.4	26.6	28.5	61.1
EU-10	3.2	2.7	5.3	2.9	7.3	3.3	6.4
EU-02	1.0	0.1	0.9	0.0	0.3	0.0	0.0
Germany	4.0	4.5	10.1	3.0	7.1	9.8	15.0
France	3.5	4.1	9.2	5.0	8.6	0.9	26.9
United Kingdom	1.9	1.2	1.6	1.7	2.0	2.6	3.6
Poland	1.8	1.8	3.2	1.3	4.0	0.8	3.3
Italy	1.9	0.9	5.6	0.0	0.0	3.2	0.1
Netherlands	1.6	1.3	3.6	2.9	2.1	8.3	8.4
India	16.0	42.0	0.0	0.1	5.0	0.0	0.0
USA	12.2	7.2	24.6	0.9	24.9	22.3	21.6
China	5.7	1.1	1.4	0.0	0.0	2.8	0.0
Pakistan	4.9	6.3	0.0	0.0	0.0	0.0	0.0
Russian Federation	4.6	2.3	3.1	1.7	2.0	4.1	0.0
Brazil	4.2	0.9	0.2	16.2	0.0	1.1	0.0
New Zealand	2.2	4.4	1.7	26.3	8.9	0.0	0.9
Turkey	1.8	1.5	0.8	0.0	0.0	0.0	0.7
Ukraine	1.7	0.8	1.2	0.7	3.4	1.6	0.4
Mexico	1.5	0.2	1.0	3.7	0.7	3.4	0.0
Argentina	1.5	0.5	2.5	7.6	1.1	0.2	0.0
Australia	1.3	1.5	1.7	5.1	5.6	0.4	4.0
Canada	1.2	0.9	1.9	0.0	2.7	1.0	0.9
Japan	1.1	0.8	0.6	1.5	5.1	1.0	0.0

Source: FAOSTAT.

Table 2.3 Milk cow numbers in selected countries (1000 head), 2000-2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
European Union											
EU-15	19,911	20,016	19,562	19,272	18,736	18,377	17,975	17,900	18,107	17,826	
EU-25					23,305	22,920	22,316	22,267	22,450	21,972	
EU-27								24,176	24,248	23,653	
EU(15/25/27)	19,911	20,016	19,562	19,272	23,305	22,920	22,316	24,176	24,248	23,653	
North America											
Canada	1,141	1,091	1,084	1,065	1,055	1,066	1,019	995	985	979	981
Mexico	6,800	6,800	6,800	6,800	6,800	6,850	6,875	6,010	6,204	6,400	6,560
United States	9,199	9,103	9,139	9,084	9,012	9,043	9,112	9,189	9,315	9,201	9,111
Sub-total	17,140	16,994	17,023	16,949	16,867	16,959	17,006	16,194	16,504	16,580	16,652
South America											
Argentina	2,450	2,450	2,150	2,000	2,000	2,100	2,150	2,150	2,150	2,100	2,100
Brazil	16,040	15,900	15,600	15,300	15,200	15,100	15,290	15,925	16,700	17,200	17,600
Sub-total	18,490	18,350	17,750	17,300	17,200	17,200	17,440	18,075	18,850	19,300	19,700
Former Soviet Union											
Russia	12,900	12,500	12,200	11,700	11,200	10,400	9,900	9,910	9,800	9,530	9,200
Ukraine	5,431	4,958	4,918	4,715	4,313	4,130	3,840	3,221	3,096	2,856	2,758
Sub-total	18,331	17,458	17,118	16,415	15,513	14,530	13,740	13,131	12,896	12,386	11,958
South Asia											
India	35,750	35,900	36,000	36,500	37,000	38,000	38,000	38,000	38,500	42,600	43,600
Asia											
China	2,280	2,848	3,420	4,466	5,466	6,800	7,900	8,755	8,575	7,115	7,350
Japan	992	971	966	964	936	910	900	871	862	848	830
Sub-total	3,272	3,819	4,386	5,430	6,402	7,710	8,800	9,626	9,437	7,963	8,180
Oceania											
Australia	2,171	2,281	2,369	2,050	2,036	2,041	1,870	1,800	1,640	1,676	1,630
New Zealand	3,337	3,557	3,749	3,842	3,920	3,970	4,100	4,163	4,200	4,597	4,753
Sub-total	5,508	5,838	6,118	5,892	5,956	6,011	5,970	5,963	5,840	6,273	6,383
Total Selected Countries	100,491	100,360	100,397	100,489	100,942	102,415	102,962	102,996	104,035	107,111	106,473

Notes: Data for 2010 are provisional.

Source: Eurostat, DG AGRI (various years); USDA (2010 and 2007).

Table 2.3 provides an overview of the total cow numbers in different regions. On average, for the period 2007-2009, nearly 40% of the reported total number of cows are kept in India, and about one fifth are located in the EU-27. The three year average 2007-2009 shares for the USA, Russia and China are 9%, 9% and 8% respectively. The corresponding share of Oceania is about 4%.For the EU and Canada, which both have dairy supply management policies, total dairy cow numbers were declining at an average rate of 1.2% and 1.5% per annum, respectively. These trends are the result of continuing milk yield increases whilst total milk output is constrained by quota. Total cow numbers for the USA did not show a particular trend, remaining rather stable. In the Former Soviet Union, cow numbers declined by about 4% per year. In Oceania, New Zealand recorded a relatively strong increase in dairy cows (+3.6% per annum), whereas in Australia the decline was about 2.8% per annum. The net result was, nevertheless, an increasing dairy cow herd in Oceania. As regards newly emerging economies, the number of dairy cows in China increased on average by more than 13% p.a., whereas for India annual average increase was close to 2%.

Table 2.4 shows average milk yields in various world regions, measured in terms of milk *delivered* per dairy cow and suggests that these developments have already started to occur (as reflected by increasing yields over time). For example the yield increases for China and India based on the reported data are 1.1% and 1.2% per annum, respectively, and the calculated annual yield increase in South America is about 2%. However, in Mexico and Ukraine with yield growth rates of more than 6% per year, adjustment is much faster. It should be noted that in Ukraine the total number of dairy cows declined at the same rate, and because of this the volume of production remained almost constant.

Table 2.4 Milk yield per cow (in tonnes per head), 2000-2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010p
European Union											
EU-15	6.11	6.12	6.13	6.27	6.34	6.50	6.58	6.62	6.70	6.69	
EU-25					6.01	6.17	6.26	6.32	6.40	6.41	
EU-27								6.06	6.16	6.17	
EU (15/25/27)	6.11	6.12	6.13	6.27	6.01	6.17	6.26	6.06	6.16	6.17	
North America											
Canada	7.15	7.43	7.35	7.30	7.40	7.40	7.89	8.25	8.40	8.46	8.51
Mexico	1.00	1.00	1.00	1.44	1.45	1.44	1.46	1.77	1.76	1.70	1.70
United States	8.25	8.24	8.44	8.50	8.60	8.87	9.02	9.16	9.25	9.33	9.60
South America											
Argentina	4.00	3.88	3.95	3.98	4.38	4.65	4.74	4.44	4.66	4.93	5.05
Brazil	1.38	1.40	1.45	1.49	1.53	1.61	1.65	1.68	1.67	1.67	1.70
Former Soviet Union											
Russia	2.47	2.64	2.75	2.82	2.86	3.08	3.14	3.25	3.32	3.42	3.45
Ukraine	2.28	2.66	2.82	2.84	3.20	3.25	3.36	3.72	3.72	3.98	3.97
South Asia											
India	1.01	1.01	1.01	1.00	1.01	1.01	1.08	1.13	1.16	1.13	1.15
Asia											
China	3.63	3.60	3.80	3.91	4.14	4.05	4.04	4.03	4.00	4.00	3.96
Japan	8.57	8.55	8.68	8.71	8.90	9.10	9.04	9.19	9.26	9.33	9.39
Oceania											
Australia	5.15	4.76	4.90	5.19	5.10	5.11	5.56	5.48	5.79	5.56	5.77
New Zealand	3.67	3.70	3.71	3.73	3.83	3.65	3.71	3.76	3.61	3.78	3.56

Notes: The table measures the yields in terms of milk *delivered* per dairy cow. By doing this, it underestimates the total amount of milk actually produced per cow for those countries where a significant part of the milk produced is not delivered to dairies. For countries/regions with high delivery rates, like the EU, the USA, Canada, Japan, Australia and New Zealand, these numbers are a good proxy for physical milk yields. However, for countries with low reported milk yields, such as Mexico, Brazil and India, where deliveries per dairy cow may be less than half those of OECD countries, it is not clear to what extent closing the gap would imply an improvement in physical yields (e.g. by breeding programs and optimization of feed nutrition) or a change in market structures (greater vertical integration and commercialisation of the supply chain).

Source: Eurostat; DG AGRI (various years); USDA(2010 and 2007).

2.1.3 World trade developments

World dairy trade (all dairy products combined) increased from 38.8 million tonnes in 2000 to 49.8 million tonnes in 2009, as expressed in milk equivalents[2] (IDF, 2010). During this period, the EU lost 14 percentage points of its global market share whereas New Zealand gained another 8 percentage points and the rest of the world gained 7 percentage points (see Table 2.5). Australia's market share declined, whereas those of Belarus and the USA increased. The relatively high aggregate market share for the rest of the world includes the relatively small contributions of a large number of exporters. The variation in the world market share of the USA over the period is striking. By contrast, the Argentine market share remained fairly constant, ending the period at the same level as Belarus. It should be recalled that this period saw prolonged drought in Australia, and high price volatility towards the end of the period.

Table 2.5 Evolution of dairy exports (in milk equivalents), 2000-2009

	2000	2005	2008	2009
World dairy trade (million tonnes)	38.8	43.9	46.8	49.8
	World market shares, per cent			
EU-27	38	26	24	24
New Zealand	19	22	21	27
Australia	16	11	8	9
USA	5	9	13	8
Belarus	2	3	4	5
Argentina	3	5	3	3
Rest of the world	17	24	27	24

Notes: World dairy trade excludes intra-EU trade.
Source: IDF (2010).

Table 2.6 reports on trade developments by dairy product, and allows a more detailed picture of the main trends.

For butter and butteroil, New Zealand was in 2009 the leading supplier of world markets with its exports representing almost half of the world trade in terms of values. New Zealand regained its market shares from 2006 and onwards reversing the decreasing annual growth rates of the first years of the last decade. The EU followed the opposite direction , which maintained its second leading position in world exports but lost almost half of the market share it had gained in 2005. It should be noted that the developments for both countries concern in particular trade for butter oil and less trade for butter. Australia recovered most of its declining market shares in 2009, while the USA lost about half of its market share, making Australia being the third bigger exporter in 2009.

Looking into cheese, the EU has been by far the main market supplier, dominating almost half of the world's exports, followed by New Zealand. Both regions hardly experienced any change in their market shares in world exports throughout the last decade.

Trade in SMP and WMP is not as concentrated as trade in butter and cheese, with the market shares of the main exporters being lower. For SMP, the EU did not maintain its dominant position of 2000, while on the contrary New Zealand and the USA, each nearly doubled their market shares in world SMP exports. Australia also saw its exports shrinking but the decline was smaller compared to the EU. The developments in WMP trade have been analogous for the EU, New Zealand and Australia. A notable difference is that Argentina was the third largest exporter, while Brazil after 2005 increased its exports, which peaked in 2008, making it hence into the top 5 exporters in 2009.

[2] Based on the non-fat solid content methodology (IDF, 2004), which, as the name implies, is based only on the non-fat solid parts of the milk.

Table 2.6 World exports and market shares for the top 5 exporters by dairy product

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
World exports, million USD										
Butter/butter oil (HS 0405)	1,199	1,141	1,148	1,402	1,824	1,973	1,768	2,281	2,997	2,174
Cheese (HS 0406)	3,564	3,855	3,920	4,448	5,388	5,860	6,253	7,696	9,293	7,584
SMP (HS 040210)	1,938	2,096	1,639	1,816	2,203	2,425	2,525	3,931	4,173	2,790
WMP (HS 040221 + 040229)	2,880	3,482	3,126	3,331	4,197	4,529	4,465	5,897	8,541	5,159
World market shares, per cent										
Butter and butteroil (HS 0405)										
New Zealand	42.4	38.3	42.5	39.2	34.9	33.5	39.5	38.6	40.5	43.7
EU	26.9	29.7	31.0	39.1	40.0	40.3	33.6	30.7	24.7	23.3
Australia	14.0	13.0	12.6	8.6	7.8	8.2	8.5	6.9	5.8	8.1
USA	0.7	0.5	0.6	1.4	1.1	1.2	1.2	5.2	9.1	3.8
Argentina	1.1	0.6	0.7	0.1	0.7	0.8	1.6	2.1	2.8	1.5
Cheese (HS 0406)										
EU	47.2	46.7	48.2	50.3	46.9	43.0	44.3	43.3	40.5	43.4
New Zealand	13.9	15.7	13.9	12.6	12.8	12.9	12.8	12.5	12.2	11.3
Australia	14.7	13.1	12.5	10.9	11.9	10.9	10.1	9.6	8.2	7.2
USA	4.2	4.4	4.3	3.5	3.7	3.5	4.0	5.1	6.2	5.8
Ukraine	1.7	1.3	1.4	1.2	1.6	2.5	2.6	1.9	1.8	2.0
SMP (HS 040210)										
New Zealand	14.2	22.2	27.2	25.5	21.4	19.7	26.0	24.1	21.1	29.7
EU	39.0	26.3	21.9	31.1	25.2	17.6	8.4	21.1	15.9	19.3
USA	8.2	9.0	7.0	10.2	20.2	23.3	23.7	21.3	33.1	18.6
Australia	17.9	17.2	20.3	11.4	13.8	15.5	15.8	11.3	10.3	12.8
Ukraine	3.3	5.1	2.6	3.8	4.6	4.5	4.4	5.1	2.9	1.6
WMP (HS 040221+040229)										
New Zealand	25.2	29.4	25.9	31.9	29.7	28.7	31.4	34.7	30.3	36.4
EU	41.1	34.3	32.7	33.8	31.5	29.5	27.2	25.6	27.1	26.9
Australia	12.8	11.3	13.7	10.3	9.7	9.1	8.6	6.8	6.9	6.8
Argentina	6.5	4.9	6.2	5.4	8.6	8.1	10.7	5.3	4.6	6.7
Brazil	0.0	0.0	0.1	0.1	1.1	1.1	0.8	2.8	4.4	1.0

Notes: 1) The order of the countries in the table follows their 2009 market shares; 2) The market shares are in value terms; 3) World exports exclude intra EU-27 trade; 4) The EU figures refer to trade of the EU-27 with third countries throughout the period.

Source: COMTRADE.

Table 2.7 shows the market shares for the top five importers in world imports per dairy product. Generally, imports have been more dispersed over importing countries and therefore the market shares of the largest importers were lower than is the case for exports.

For butter, Russia and Mexico attracted about 10% each of the world's imports in 2009, followed by the USA, China and Ukraine. Particularly notable is China's growing presence as an importer of butter over the period 2000-2009. For cheese, the USA remained the largest importer but its import share declined gradually after 2006, and only started recovering in 2009. Russia on the contrary was the main emerging large importer and from 2007 onwards was the second largest importer. Japan and the EU are also big cheese importers, but both have recorded declining shares of world imports.

As for milk powders, China is the only country among the top five importers that did not experience a decline of its SMP and WMP imports. Its imports more than doubled over this last decade, making it an important market destination for milk powder.

Table 2.7 World imports and market shares for the top 5 importers by dairy product

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
World imports, million USD										
Butter/butter oil (HS 0405)	965	1,101	1,060	1,258	1,629	1,770	1,596	1,904	2,390	1,497
Cheese (HS 0406)	3,455	3,734	3,817	4,365	5,054	5,559	5,843	6,981	8,265	6,949
SMP (HS 040210)	1,807	2,188	1,727	1,904	2,346	2,486	2,413	3,996	4,297	2,559
WMP (HS 040221 + 040229)	2,189	2,655	2,178	2,341	2,733	3,561	3,987	4,899	6,315	4,007
World market shares, per cent										
Butter and butteroil (HS 0405)										
Russia	7.8	11.3	12.5	14.7	10.0	8.6	12.4	9.1	10.4	10.9
Mexico	6.0	6.0	6.6	6.5	8.9	10.3	7.0	8.3	7.5	10.1
USA	3.9	9.4	6.1	5.3	8.6	8.3	5.6	5.1	2.6	4.6
China	0.5	0.2	0.6	1.3	1.5	1.8	1.7	1.9	2.5	4.4
Ukraine	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.4	3.0
Cheese (HS 0406)										
USA	21.1	21.0	21.9	21.3	20.3	19.1	18.3	16.6	14.7	15.1
Russia	1.8	4.5	6.2	8.1	9.1	11.9	10.2	12.1	13.0	12.8
Japan	15.9	14.9	15.1	13.1	13.8	13.2	12.4	12.0	12.1	11.7
EU (extra)	13.4	13.3	12.0	11.6	10.2	9.2	9.3	8.7	8.2	8.6
Australia	3.0	3.0	3.0	3.1	3.4	3.7	3.9	3.7	4.3	3.8
SMP (HS 040210)										
Mexico	12.9	14.1	11.6	11.6	11.9	14.4	10.3	11.6	12.5	13.8
China	1.9	1.7	3.0	3.7	4.5	3.8	5.6	3.6	5.0	6.1
Japan	4.6	4.8	3.8	3.5	2.9	2.8	2.7	2.7	2.8	3.1
Russia	1.9	1.6	0.1	0.6	1.0	1.5	0.5	1.1	0.8	0.9
Brazil	3.0	1.1	1.7	0.6	0.3	0.5	0.8	0.3	0.6	0.9
WMP (HS 040221+040229)										
China	3.7	2.9	5.0	6.2	6.1	3.9	3.9	3.7	2.9	10.6
Brazil	9.2	3.3	6.8	2.6	1.6	1.8	1.7	1.2	1.5	3.1
Mexico	2.8	4.6	3.0	3.5	2.4	2.9	2.5	3.0	1.7	1.3
USA	0.4	0.4	0.5	0.7	0.7	1.0	0.9	0.6	0.5	0.9
Australia	0.3	0.4	0.2	0.3	0.6	0.4	0.3	0.4	0.5	0.5

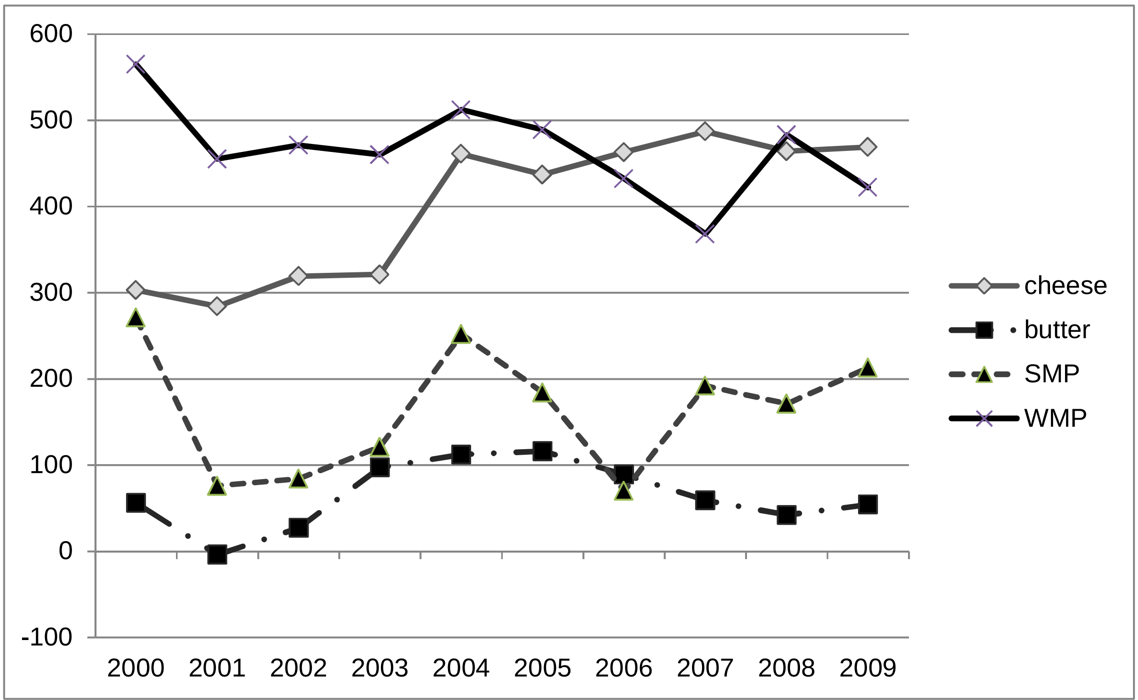
Notes: 1) The order of the countries in the table follows their 2009 market shares; 2) The market shares are in terms of values; 3) World exports exclude intra EU-27 trade; 4) The EU figures refer to trade of the EU-27 with third countries throughout the period.

Source: COMTRADE.

Figure 2.5 shows the evolution during 2000-2009 of net exports of the EU for four key dairy products, notably cheese, butter, SMP and whole milk powder. The EU was a net exporter of dairy products throughout the period and its net exports increased by 44%, because of both increasing exports and declining imports, and this holds for all four products shown in the figure. The decline in imports from third countries is partly because of the EU enlargement in 2004 (the intra-EU trade increased). The entry of 10 new Member States coincides with an increase in the underlying level of cheese exports. The net exports of whole milk powder declined, in particular after 2003. There is no clear pattern in the EU's net exports of SMP, which show significant fluctuations around a mean of 164 thousand tonnes. Net exports of butter first increased to 116 thousand tonnes in 2005, then they declined to about 50 thousand tonnes.

The variability of global demand has been particularly visible in recent dairy trade developments. The global economic crisis and volatile world market prices in the second half of the decade disrupted the smoother patterns observed in earlier years. The year 2010 was marked by food safety concerns in China, which boosted Chinese imports of milk powders, by increased demand from Russia and southern Asian countries, as well as by constrained supply in Oceania (in particular, New Zealand). These developments affected EU trade and led to an increase of the EU milk powder exports (in particular SMP).

Figure 2.5 EU net exports (1000 tonnes) of cheese, butter, skim milk powder (SMP) and whole milk powder (WMP), 2000-2009



Source: own calculations based on COMTRADE (data as reported in Tables 2.8 to 2.11).

Tables 2.8 to 2.11 show the EU's exports and imports, separated into intra and extra EU trade, and differentiated with respect to destination and origin. The EU increased its market share in the growing domestic market for high value-added commodities, while gradually losing world market share primarily for bulk commodities like SMP and WMP. With respect to cheese, the EU has been able to expand its domestic trade and to maintain its share on the world market. Except for the exports of cheese, the exports of the other products declined by -0.4% (butter), -2.6% (SMP), and -3.2% (whole milk powder) respectively.

Table 2.8 EU trade in cheese (HS 0406), 2000-2009

Destination	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	EU[1] exports of cheese and curd, 1000 tonnes									
Intra-EU (15/25/27)	2047	2343	1981	2273	2499	2696	2856	2980	3071	2900
Extra-EU	450	463	480	506	578	545	578	592	553	553
Extra-EU, of which										
Accession countries	22	18	25	26	4	5	7			
Non-EU Europe	104	110	124	150	184	187	224	231	240	233
Russian Fed.	*56*	*60*	*69*	*92*	*112*	*122*	*157*	*157*	*163*	*150*
Switzerland	*30*	*32*	*30*	*31*	*33*	*31*	*33*	*37*	*41*	*45*
NAFTA	122	130	133	135	149	133	133	144	126	114
USA	*97*	*102*	*104*	*110*	*125*	*112*	*112*	*120*	*103*	*96*
Asia	55	62	60	66	77	68	69	73	60	65
Japan	*46*	*51*	*48*	*51*	*57*	*50*	*48*	*45*	*35*	*37*
Middle East	81	80	74	67	90	76	64	61	49	59
Saudi Arabia	*37*	*36*	*33*	*28*	*38*	*32*	*26*	*24*	*17*	*18*
Africa	28	30	32	35	44	47	49	48	48	53
Other America	25	23	23	18	19	16	20	20	16	16
Oceania	9	8	8	8	10	10	11	14	14	14
Rest of World	5	2	3	2	2	2	1	1	0	0

Origin	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	EU[1] imports of cheese and curd, 1000 tonnes									
Intra-EU (15/25/27)	1851	2050	2043	2156	2435	2492	2753	3004	3078	3038
Extra-EU	146	179	161	185	117	108	115	106	89	84
Extra-EU, of which										
Accession countries	18	44	45	57	8	10	8			
Poland	*1*	*11*	*12*	*14*						
Lithuania	*3*	*8*	*8*	*8*						
Latvia	*2*	*6*	*5*	*6*						
Estonia	*2*	*3*	*5*	*7*						
Other Europe	46	47	44	43	45	48	47	49	50	53
Switzerland	*43*	*43*	*41*	*40*	*41*	*43*	*41*	*45*	*45*	*49*
Oceania	74	81	63	78	57	45	55	48	30	26
New Zealand	*30*	*43*	*38*	*53*	*31*	*25*	*42*	*36*	*20*	*22*
Australia	*44*	*38*	*25*	*25*	*26*	*19*	*13*	*12*	*9*	*4*
NAFTA	7	6	5	4	4	5	5	8	9	4
Asia			1	1						
Africa	1		3	1	2					
Other America					1	1				

	EU[1] net trade in cheese and curd, 1000 tonnes									
EU net exports	303	284	319	321	461	437	463	487	464	469

Notes: 1) Number of EU-members varying with the year
Source: COMTRADE.

Table 2.9 EU trade in butter (of HS 040510), 2000-2009

Destination	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	EU[1] exports of butter, 1000 tonnes									
Intra-EU (15/25/27)	387	400	359	418	498	461	509	545	529	518
Extra-EU	130	125	151	227	218	215	188	166	113	103
Extra-EU, of which										
Accession countries	6	5	10	11	5	4	4			
Middle East	30	29	41	40	51	58	46	38	35	32
Iran	*4*	*2*	*13*	*9*	*14*	*20*	*9*	*12*	*18*	*11*
Saudi Arabia	*12*	*13*	*13*	*15*	*17*	*19*	*20*	*11*	*5*	*8*
Other Europe	37	29	36	62	42	37	51	39	25	24
Russian Fed.	*26*	*21*	*31*	*55*	*33*	*29*	*42*	*28*	*20*	*19*
Africa	31	41	37	58	60	60	40	39	22	21
Egypt	*6*	*12*	*6*	*18*	*20*	*20*	*11*	*20*	*3*	*8*
Morocco	*14*	*20*	*21*	*27*	*26*	*24*	*16*	*8*	*10*	*4*
Asia	16	13	20	44	44	41	35	36	26	20
Other America	5	4	3	6	6	6	5	4	2	2
NAFTA	2	2	2	3	6	4	4	3	3	2
Oceania	1	1	1	1	1	1	1	1	1	1
Rest of World	2	1	2	2	3	2	1	1		

Origin	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	EU[1] imports of butter, 1000 tonnes									
Intra-EU (15/25/27)	465	452	485	505	555	552	641	580	522	522
Extra-EU	73	129	125	131	106	99	99	106	72	49
Extra-EU, of which										
Accession countries	13	32	31	31						
Poland	*2*	*11*	*9*	*10*						
Czech Rep.	*2*	*7*	*8*	*5*						
Estonia	*4*	*5*	*5*	*6*						
Oceania	58	96	91	98	102	96	98	97	66	45
New Zealand	*52*	*92*	*89*	*95*	*97*	*95*	*97*	*95*	*64*	*44*
Other Europe	1	1	1	1	1	1		2	2	2
NAFTA								6	3	
Middle East						1		1		
Asia				1						
Africa										
Other America					2					
Rest of World										1

	EU[1] net trade in butter, 1000 tonnes									
EU net exports	56	-4	27	97	112	116	89	59	42	54

Notes: 1) Number of EU-members varying with the year.
Source: COMTRADE.

Table 2.10 EU trade in skim milk powder (HS 040210), 2000-2009

Destination	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
					EU[1] exports of skim milk powder, 1000 tonnes					
Intra-EU (15/25/27)	526	450	413	479	556	537	559	542	534	493
Extra-EU	357	142	161	223	283	194	90	208	179	217
Extra-EU, of which										
Accession countries	5	2	3	4	6	4	4			
Africa	95	58	69	68	106	82	43	88	112	108
Algeria	*54*	*19*	*22*	*22*	*53*	*32*	*14*	*48*	*72*	*45*
Egypt	*10*	*11*	*12*	*14*	*16*	*14*	*7*	*5*	*6*	*28*
Nigeria	*10*	*10*	*9*	*11*	*14*	*16*	*11*	*14*	*13*	*11*
Morocco	*4*	*9*	*14*	*9*	*8*	*9*	*7*	*11*	*6*	*8*
Asia	131	52	55	95	118	71	30	72	32	65
Indonesia	*31*	*13*	*16*	*27*	*24*	*16*	*5*	*20*	*8*	*12*
China	*6*	*1*	*6*	*7*	*11*	*3*	*1*	*3*	*3*	*8*
Thailand	*21*	*9*	*11*	*16*	*31*	*21*	*7*	*15*	*6*	*7*
Malaysia	*17*	*7*	*4*	*13*	*14*	*5*	*2*	*13*	*2*	*7*
Viet Nam	*6*	*3*	*4*	*10*	*14*	*11*	*8*	*7*	*2*	*6*
Philippines	*28*	*7*	*4*	*7*	*10*	*4*		*6*	*1*	*3*
Middle East	20	9	11	18	28	15	6	12	13	20
Other Europe	2	1	3	4	6	5	4	6	14	16
Russian Fed.	*1*	*1*			*1*	*1*	*1*	*2*	*5*	*8*
Other America	42	12	10	14	6	10	3	10	8	5
Cuba	*15*	*5*	*4*	*7*		*3*	*1*	*3*	*1*	*1*
NAFTA	61	8	10	19	13	6	1	14		3
Mexico	*60*	*7*	*10*	*19*	*13*	*6*	*1*	*13*		*3*

Origin	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
					EU[1] imports of skim milk powder, 1000 tonnes					
Intra-EU (15/25/27)	542	442	375	480	611	546	511	532	529	482
Extra-EU	86	66	76	102	31	10	20	15	8	5
Extra-EU, of which										
EU accession	48	31	45	46						
Poland	*14*	*8*	*18*	*18*						
Czech Rep.	*13*	*8*	*6*	*6*						
Estonia	*8*	*3*	*8*	*9*						
Hungary	*1*	*2*	*4*	*4*						
Slovakia	*4*	*3*	*4*	*4*						
Other Europe	32	34	12	4	6	4	3	8	1	2
Ukraine	*18*	*22*	*2*		*1*	*1*				
Russian Fed.	*9*	*7*	*1*							
Switzerland	*5*	*1*	*6*	*3*	*4*	*4*	*2*	*1*		*1*
Middle East			1	1			1			1
Oceania	3	1	16	47	4		5	3	1	
New Zealand			*16*	*47*	*3*		*4*	*2*	*1*	
NAFTA			2	3	22	4	11	5	5	
Asia										
Rest of World.										
Other America	2									
Africa										

					EU[1] net trade in skim milk powder, 1000 tonnes					
EU net exports	271	76	84	121	252	184	70	192	171	213

Notes: 1) Number of EU-members varying with the year

Source: COMTRADE.

Table 2.11 EU trade in whole milk powder (HS 040221 + 040229), 2000-2009

Destination	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	EU[1] exports of whole milk powder, 1000 tonnes									
Intra-EU (15/25/27)	219	208	229	251	286	278	330	320	342	272
Extra-EU	573	475	490	477	516	492	435	370	484	426
Extra-EU, of which										
Accession countries	5	3	4	3	3	2	3			
Africa	209	196	226	230	230	233	235	179	218	203
Algeria	*104*	*89*	*108*	*83*	*72*	*75*	*69*	*62*	*84*	*58*
Nigeria	*16*	*26*	*30*	*41*	*41*	*40*	*44*	*38*	*43*	*37*
Egypt	*10*	*6*	*5*	*9*	*11*	*8*	*8*	*8*	*6*	*14*
Senegal	*15*	*12*	*10*	*17*	*18*	*20*	*13*	*9*	*10*	*14*
Angola	*4*	*6*	*7*	*9*	*10*	*6*	*15*	*10*	*12*	*12*
Middle East	161	150	141	122	174	132	119	102	157	136
Oman	*13*	*31*	*14*	*14*	*19*	*21*	*20*	*20*	*54*	*45*
Saudi Arabia	*50*	*46*	*50*	*46*	*54*	*37*	*42*	*35*	*35*	*19*
Lebanon	*10*	*9*	*9*	*9*	*13*	*10*	*11*	*8*	*9*	*14*
United Arab Em.	*20*	*17*	*16*	*17*	*22*	*20*	*16*	*14*	*14*	*14*
Iraq	*31*	*11*	*11*	*3*	*30*	*4*	*1*	*2*	*9*	*11*
Asia	54	43	36	48	43	59	27	39	35	39
China	*3*		*1*	*3*	*1*	*1*	*1*	*1*	*5*	*8*
Indonesia	*4*	*4*	*3*	*7*	*5*	*4*	*3*	*9*	*7*	*6*
Other America	127	79	67	66	59	61	46	42	68	38
Dominican Rep.	*27*	*22*	*23*	*17*	*13*	*23*	*20*	*23*	*16*	*14*
Venezuela	*34*	*22*	*12*	*21*	*18*	*7*	*7*	*3*	*39*	*12*
Cuba	*20*	*3*	*4*	*6*	*10*	*13*	*6*	*3*		*1*
Other Europe	3	2	2	2	6	4	4	3	5	8
NAFTA	7	1	14	5	1	1	0	1	1	1
Rest of World	5									
Oceania									1	

Origin	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
	EU[1] imports of whole milk powder, 1000 tonnes									
Intra-EU (15/25/27)	249	219	244	238	283	295	302	309	300	267
Extra-EU	8	20	19	17	4	3	3	2	1	3
Extra-EU:										
EU accession	7	18	16	14						
Czech Rep.	*3*	*3*	*4*	*3*						
Estonia	*2*	*5*	*6*	*7*						
Poland		*5*	*2*	*1*						
Rest of World										2
Other Europe				2	2	3	1	1		
Oceania	1	2	3	1	1		2	1	1	

	EU[1] net trade in whole milk powder, 1000 tonnes									
EU net exports	565	455	471	460	512	489	432	368	483	422

Notes: 1) Number of EU-members varying with the year

Source: COMTRADE.

2.2 EU dairy production and prices

2.2.1 Raw cow's milk supply in the EU

Table 2.12 shows the evolution of raw cows' milk production in the EU. Milk production has remained rather stable during the last decade with Germany, France, UK and Poland being the main milk producers, followed closely by the Netherlands and Italy.

Table 2.13 shows the evolution of milk collection per MS for the period 2000-2009. The distribution of milk collection per MS is shown in Table 2.14. France and Germany are consistently the countries with the largest volume of milk delivered to dairies, together accounting for about 40% of EU milk deliveries. Italy, the Netherlands and the UK account for 25%, while Poland and Spain follow with around 10%. Poland is the largest supplier among the new MS, with around 50% of collection in EU-12.

Table 2.12 Raw cows' milk produced by member State, 2000-2009, 1000 t

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	3,233	3,300	3,292	3,230	3,137	3,114	3,147	3,155	3,196	3,230
Belgium	3,425	3,357	3,160	3,127	3,120	3,082	2,917	2,943	2,892	2,996
Denmark	4,719	4,553	4,590	4,659	4,568		4,627	4,619	4,656	4,814
Finland	2,524	2,530	2,532	2,472	2,449	2,433	2,413	2,356	2,311	2,332
France	24,929	24,862	25,254	24,667	24,452	24,675	24,367	23,426	24,272	23,341
Germany	28,332	28,191	27,874	28,533	28,245	28,453	27,995	28,403	28,656	29,199
Greece	789	778	758	768	762	761	764	774	787	753
Ireland	5,212	5,382	5,233	5,397	5,307	5,100	5,272	5,268	5,130	4,967
Italy	10,774	10,764	10,743	10,750	10,728	10,975	10,989	11,062	11,286	11,364
Luxembourg	264	270	271	267	269	270	268	274	278	284
Netherlands	10,966	11,291	10,677	11,075	10,905	10,846	10,995	11,128	11,620	11,791
Portugal	2,060	1,983	2,103	1,952	2,010	2,061	1,984	1,969	2,022	1,999
Spain	6,290	6,495	6,610	6,637	6,576	6,561	6,378	6,320	6,340	6,251
Sweden	3,348	3,339	3,274	3,253	3,275	3,206	3,130	2,986	2,987	2,933
United Kingdom	14,496	14,714	14,877	15,020	14,643	14,574	14,348	14,073	13,722	13,596
Cyprus	147	142	153	162	151	147	149	144	152	152
Czech Rep.	2,789	2,783	2,810	2,725	2,675	2,813	2,767		2,801	2,781
Estonia	630	684	611	611	652	670	692	692	694	671
Hungary	2,137	2,136	2,124	2,031	1,895	1,929	1,844	1,842	1,840	1,758
Latvia	823	846	812	783	784	807	812	838	832	828
Lithuania	1,713	1,718	1,765	1,789	1,842	1,854	1,885	1,931	1,879	1,787
Malta	45	45	43	40	42	41	41	41	40	
Poland	11,889	11,884	11,873	11,892	11,822	11,923	11,982	12,096	12,425	12,447
Slovakia	1,099	1,147	1,198	1,142	1,079	1,100	1,092	1,075	1,057	957
Slovenia	649	653	686	664	650	659	642	666	654	626
Bulgaria	1,409	1,224	1,306	1,309	1,345	1,287	1,299	1,148	1,143	1,073
Romania	5,002	5,159			5,024	4,977	5,285	4,997	4,854	4,654
Total	149,693	150,229	144,627	144,955	148,407	144,318	148,081	144,225	148,526	147,582
EU-15	121,361	121,808	121,248	121,806	120,446	116,111	119,593	118,754	120,154	119,849
EU-10	21,921	22,038	22,073	21,840	21,592	21,942	21,905	19,325	22,375	22,006
EU-02	6,411	6,383	1,306	1,309	6,369	6,264	6,584	6,145	5,997	5,727

Source: Eurostat.

Table 2.13 Raw cows' milk collected by EU Member State, 2000-2010, 1000 t

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Austria	2,655	2,651	2,650	2,645	2,618	2,619	2,672	2,661	2,705	2,709	2,781
Belgium	3,124	3,088	2,895	2,829	2,845	2,868	2,837	2,879	2,849	2,954	3,068
Denmark	4,520	4,418	4,454	4,540	4,434	4,449	4,492	4,515	4,586	4,741	4,818
Finland	2,442	2,459	2,447	2,399	2,373	2,362	2,348	2,293	2,254	2,281	2,289
France	23,282	23,196	23,634	23,118	22,908	23,325	22,909	22,982	23,815	22,845	23,356
Germany	26,984	26,883	26,621	27,320	27,113	27,311	26,821	27,321	27,466	28,248	28,659
Greece	556	611	562	649	647	696	731	703	690	684	688
Ireland	5,160	5,338	5,182	5,310	5,268	5,061	5,225	5,225	5,090	4,928	5,344
Italy	10,084	10,006	9,985	9,992	9,969	10,127	10,193	10,265	10,489	10,560	10,408
Luxembourg	256	261	261	257	258	258	255	259	265	271	282
Netherlands	10,551	10,683	10,476	10,694	10,532	10,407	10,626	10,737	10,936	11,469	11,634
Portugal	1,868	1,816	1,936	1,818	1,875	1,911	1,851	1,836	1,890	1,869	1,824
Spain	5,432	5,812	5,955	5,893	5,907	5,914	5,838	5,717	5,849	5,750	5,832
Sweden	3,297	3,290	3,226	3,206	3,229	3,163	3,130	2,986	2,955	2,931	2,860
United Kingdom	13,932	14,156	14,359	14,554	14,114	14,038	13,920	13,647	13,350	13,233	13,584
Cyprus					140	144	138	144	150	149	151
Czech Rep.					2,566	2,546	2,393	2,446	2,433	2,354	2,317
Estonia					536	571	606	593	606	592	604
Hungary					1,590	1,519	1,448	1,448	1,425	1,407	1,267
Latvia					464	502	592	631	635	595	625
Lithuania					1,139	1,202	1,297	1,350	1,382	1,275	1,278
Malta					41	42	41				
Poland						8,821	8,813	8,734	9,112	9,136	8,990
Slovakia					937	968	962	964	946	852	800
Slovenia					503	508	511	530	524	517	519
Bulgaria								758	681	579	539
Romania								1,144	1,053	978	901
Total	114,143	114,668	114,643	115,224	122,006	131,332	130,649	132,768	134,136	133,907	135,418
EU-15	114,143	114,668	114,643	115,224	114,090	114,509	113,848	114,026	115,189	115,473	117,427
EU-10					7,916	16,823	16,801	16,840	17,213	16,877	16,551
EU-02								1,902	1,734	1,557	1,440

Source: Eurostat.

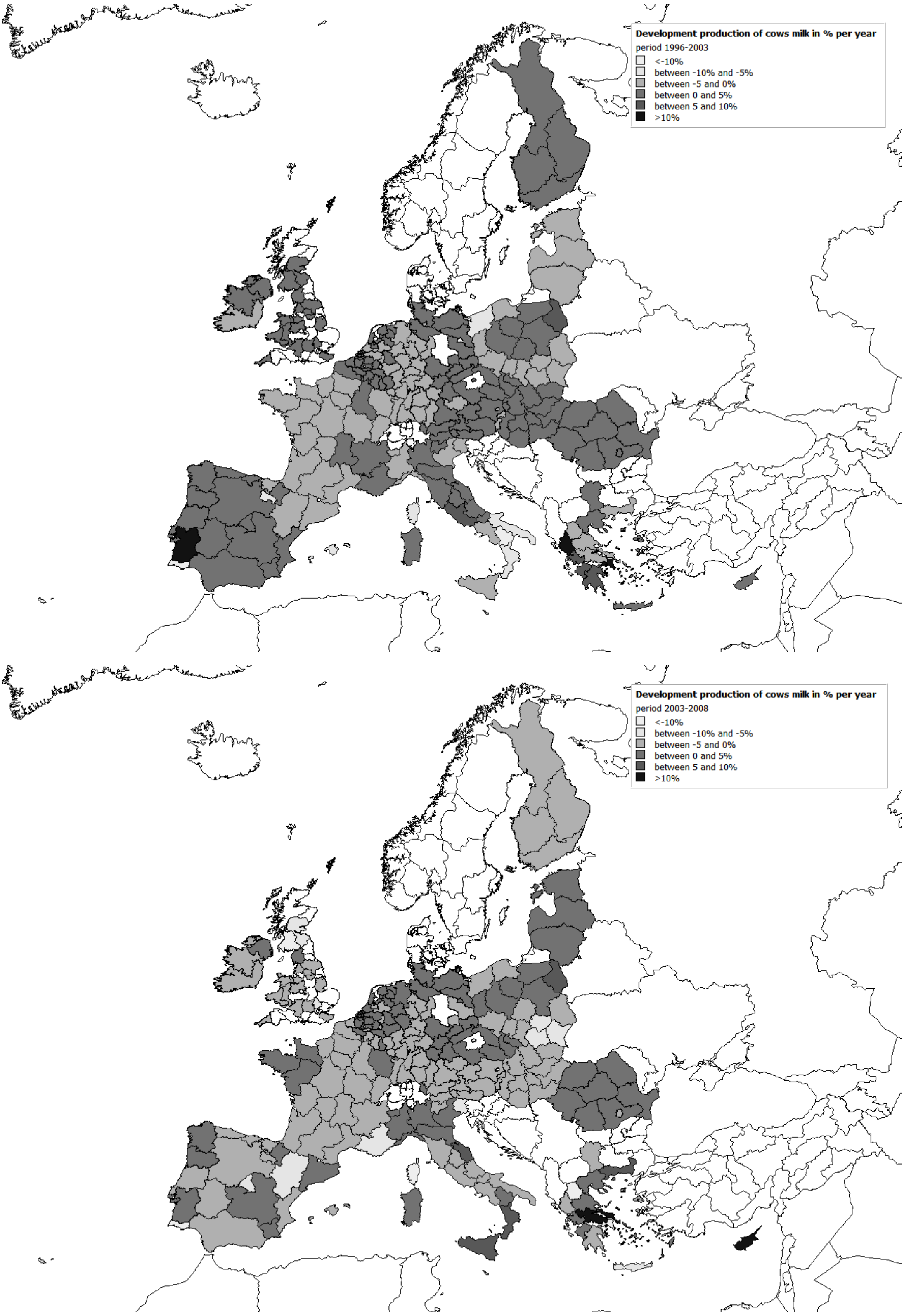
Table 2.14 Share (%) of raw cow milk collected by EU Member State, 2000-2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Austria	2.33	2.31	2.31	2.30	2.29	2.29	2.35	2.33	2.35	2.35	2.37
Belgium	2.74	2.69	2.53	2.46	2.49	2.50	2.49	2.52	2.47	2.56	2.61
Denmark	3.96	3.85	3.89	3.94	3.89	3.89	3.95	3.96	3.98	4.11	4.10
Finland	2.14	2.14	2.13	2.08	2.08	2.06	2.06	2.01	1.96	1.98	1.95
France	20.40	20.23	20.62	20.06	20.08	20.37	20.12	20.16	20.67	19.78	19.89
Germany	23.64	23.44	23.22	23.71	23.76	23.85	23.56	23.96	23.84	24.46	24.41
Greece	0.49	0.53	0.49	0.56	0.57	0.61	0.64	0.62	0.60	0.59	0.59
Ireland	4.52	4.66	4.52	4.61	4.62	4.42	4.59	4.58	4.42	4.27	4.55
Italy	8.83	8.73	8.71	8.67	8.74	8.84	8.95	9.00	9.11	9.14	8.86
Luxembourg	0.22	0.23	0.23	0.22	0.23	0.23	0.22	0.23	0.23	0.23	0.24
Netherlands	9.24	9.32	9.14	9.28	9.23	9.09	9.33	9.42	9.49	9.93	9.91
Portugal	1.64	1.58	1.69	1.58	1.64	1.67	1.63	1.61	1.64	1.62	1.55
Spain	4.76	5.07	5.19	5.11	5.18	5.16	5.13	5.01	5.08	4.98	4.97
Sweden	2.89	2.87	2.81	2.78	2.83	2.76	2.75	2.62	2.57	2.54	2.44
United Kingdom	12.21	12.35	12.52	12.63	12.37	12.26	12.23	11.97	11.59	11.46	11.57
EU-15	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Cyprus					1.77	0.86	0.82	0.86	0.87	0.88	0.91
Czech Rep.					32.42	15.13	14.24	14.52	14.13	13.95	14.00
Estonia					6.77	3.39	3.61	3.52	3.52	3.51	3.65
Hungary					20.09	9.03	8.62	8.60	8.28	8.34	7.66
Latvia					5.86	2.98	3.52	3.75	3.69	3.53	3.78
Lithuania					14.39	7.14	7.72	8.02	8.03	7.55	7.72
Malta					0.52	0.25	0.24	0.00	0.00	0.00	0.00
Poland					0.00	52.43	52.46	51.86	52.94	54.13	54.32
Slovakia					11.84	5.75	5.73	5.72	5.50	5.05	4.83
Slovenia					6.35	3.02	3.04	3.15	3.04	3.06	3.14
EU-10					100.00	100.00	100.00	100.00	100.00	100.00	100.00
Bulgaria								39.85	39.27	37.19	37.43
Romania								60.15	60.73	62.81	62.57
EU-02								100.00	100.00	100.00	100.00
Total (1000t)	114,143	114,668	114,643	115,224	122,006	131,332	130,649	132,768	134,136	133,907	135,418
EU-15	100.00	100.00	100.00	100.00	93.51	87.19	87.14	85.88	85.87	86.23	86.71
EU-10					6.49	12.81	12.86	12.68	12.83	12.60	12.22
EU-02								1.43	1.29	1.16	1.06
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: own calculations.

Figure 2.6 provides a more detailed overview of the geographical changes in EU milk production since 1996 at NUTS2 level (comparison of annual growth rates in milk production for sub periods 1996-2003 and 2003-2008). Note that where milk quota are binding and fixed an increase in one location has to be matched by a decrease elsewhere (in reality quota have been increased, be it at modest rates). As such Figure 2.6 illustrates the extent to which milk production is migrating within Member States. An illustrative example is the increase of milk production in the West of France The first is the West of France (consisting of the regions Bretagne, Basse-Normandie and Pays-de-la-Loire), which together now produce 45% of the total national milk supply. The graph also suggests that on average the increase in milk production has slowed down in the period 2003-2008 as compared to the period 1996-2003.

Figure 2.6 Geographical changes in milk production in the EU at NUTS2 level: comparison of periods 1996-2003 and 2003-2008



Note: Data for two Scottish regions were missing.
Source: Eurostat (FSS).

Table 2.15 shows the share of on-farm use and direct sales in total cows' milk production. The on-farm use and direct sales are derived as the difference between milk produced and milk delivered to dairies. This share tends to be higher in the new Member States (EU-10 and EU-02) compared to EU-15. Although there are marked differences between Member States in EU-15, with Austria having the highest share and Sweden and Ireland the lowest, within each Member State shares remained relatively stable, with just a slight downward trend. By contrast, it fell significantly in almost all new MS apart from the Czech Republic and Hungary. However, the share of on-farm use and direct sales in 2009 were still generally higher (and hence that of deliveries to dairies lower) compared to EU-15 at the end of the period. Romania stands out in that most cows' milk produced milk is not delivered to dairies.

Table 2.15 Share (%) of on-farm use and direct sales in total cows' milk production by Member State, 2000-2009

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	17.7	19.6	19.5	18.1	16.6	15.8	15.0	15.6	15.0	15.9
Belgium	8.8	8.0	8.4	9.5	8.8	6.9	2.7	2.2	1.5	1.4
Denmark	4.2	3.0	2.9	2.9	3.0		2.9	2.9	1.6	1.7
Finland	3.2	3.2	3.4	3.2	3.1	2.9	2.7	2.7	2.5	2.2
France	6.5	6.6	6.4	6.3	6.3	5.2	6.0	1.9	2.0	1.9
Germany	4.8	4.6	4.6	4.3	4.0	3.8	4.0	3.8	4.2	6.0
Greece	15.1	9.3	10.6	13.9	9.9	13.3	12.3	7.5	10.3	9.0
Ireland	1.0	0.8	0.8	0.8	0.7	0.8	0.7	0.5	0.5	0.5
Italy	6.4	7.0	7.1	7.1	6.8	6.9	7.2	7.2	7.1	7.6
Luxembourg	3.2	3.2	3.6	3.8	4.0	4.3	4.9	5.4	4.6	4.5
Netherlands	2.2	4.1	3.0	3.4	3.2	3.4	3.1	3.0	2.8	2.7
Portugal	8.1	8.1	8.1	6.8	6.8	6.8	6.7	6.7	6.7	6.5
Spain	13.9	11.3	10.2	11.5	10.6	10.1	8.7	9.3	8.0	8.1
Sweden	1.5	1.5	1.5	1.4	1.4	1.3	0.0	0.0	0.0	0.0
United Kingdom	3.9	3.8	3.5	3.1	3.6	3.7	3.0	3.0	2.7	2.6
Cyprus	7.9	7.4	7.1	7.4	7.5	1.6	6.5	0.0	0.2	0.1
Czech Rep.	8.2	7.3	7.8	4.6	4.2	9.6	13.5		13.1	15.3
Estonia	35.0	37.4	19.0	20.6	17.8	14.7	12.4	14.2	12.6	8.7
Hungary	14.4	8.2	10.3	15.4	18.6	21.3	21.5	21.4	22.5	20.0
Latvia	51.0	66.3	52.6	44.3	39.0	37.8	27.1	24.8	23.8	28.1
Lithuania	44.7	42.9	45.0	42.6	38.1	35.2	31.2	30.2	26.8	
Malta	0.7	0.2	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0
Poland	43.0	39.1	37.4	36.6	31.0	26.0	26.3	27.7	28.4	26.6
Slovakia	15.4	14.5	16.4	14.8	13.1	12.0	11.9	10.3	10.6	11.0
Slovenia	30.5	29.2	29.7	24.9	22.6	22.9	20.4	20.4	19.8	17.3
Bulgaria	49.0	43.1	42.5	37.7	40.7	37.6	35.4	35.1	35.3	34.3
Romania	83.1	83.6			79.7	77.7	78.6	77.3	78.3	78.7
Total	12.8	12.5	9.0	8.7	11.0	7.5	10.4	7.9	9.5	9.1
EU-15	5.7	5.7	5.5	5.4	5.2	1.2	4.8	3.9	3.8	4.3
EU-10	33.9	31.5	30.0	29.2	25.8	23.3	23.2	12.6	23.9	19.1
EU-02	75.6	75.8			71.5	69.5	70.0	69.4	70.1	70.4

Source: own calculations based on Eurostat (data as reported in Tables 2.12 and 2.14).

The different trends between the EU-15 and the EU-10 on on-farm use and direct sales of milk imply differences in consumption and supply and trends. The rather stable proportion in EU-15 indicates mature marketing structures adapted to national preferences for direct sales of milk an farm-produced dairy products. The marked decrease for many New Member States after their accession to the EU (or even in anticipation of that event) suggests increasing commercialisation of dairying and integration of the supply chain for dairy products.

Table 2.16 indicates where milk other than cows' milk is produced in the EU. Greece, Bulgaria, France and Spain are the main EU producers of sheep and goat milk, while Italy is the largest buffalo milk producer.

Table 2.16 Milk collected, EU Member State totals and shares of national totals by animal type, 2009

	Total volume collected	Volume by animal type				Share of total by animal type			
		Cows	Sheep	Goat	Buffalo	Cows	Sheep	Goat	Buffalo
	Thousand tonnes					Per cent			
Austria	2,724.7	2,715.6	3.4	5.8		99.7	0.1	0.2	
Belgium	2,962.6	2,954.4		8.1		99.7		0.3	
Bulgaria	641.9	599.9	33.4	6.5	2.2	93.5	5.2	1.0	0.3
Cyprus	190.0	152.1	19.4	18.6		80.0	10.2	9.8	
Spain	6,457.6	5,742.1	373.5	341.9	0.1	88.9	5.8	5.3	0.0
France	23,646.8	22,898.2	251.5	497.1		96.8	1.1	2.1	
Greece	1,368.8	685.0	529.7	154.1		50.0	38.7	11.3	
Hungary	1,407.8	1,407.1	0.7			100.0	0.1		
Italy	11,138.1	10,500.0	440.7	22.6	174.9	94.3	4.0	0.2	1.6
Netherlands	11,655.6	11,468.6				98.4		1.6	
Poland	9,141.6	9,140.0	0.1	1.5		100.0	0.0	0.0	
Portugal	1,900.5	1,867.6	21.2	11.7		98.3	1.1	0.6	
Romania	1,011.5	991.6	13.7	4.0	2.1	98.0	1.4	0.4	0.2
Slovakia	856.9	852.4	4.6			99.5	0.5		
EU-02	1,653.4	1,591.5	47.1	10.5	4.3	96.3	2.9	0.6	0.3
EU-10	12,113.2	12,068.3	24.7	20.1		99.6	0.2	0.2	
EU-15	61,854.7	58,831.5	1,619.9	1,228.3	175.0	95.1	2.6	2.0	0.3
EU-27	75,621.3	72,491.3	1,691.8	1,258.9	179.3	95.9	2.2	1.7	0.2

Source: Eurostat.

Table 2.17 looks at trends in the fat and protein content of raw cows' milk delivered to dairies over the last decade. The fat content of the milk produced in the EU-15 remained almost stable with small variations among the years but no real trend. In the new Member States, fat content increased except in Poland. Among the Member States with the higher levels of fat content are Poland, Denmark and Germany. On average, fat content in the EU-10 tends to be a little higher than in EU-15, whereas it is considerably lower in Romania and Bulgaria. The variations in the protein content between 2000 and 2009 have been even smaller. There was, however, a slight upward trend over the whole period.

Table 2.17 Fat and protein content (%) in raw cows' milk delivered to dairies, by Member State, 2000-2009

Fat content	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	4.13	4.17	4.17	4.20	4.23	4.20	4.19	4.21	4.19	4.19
Belgium	4.08	4.10	4.07	4.09	4.14	4.09	4.10	4.07	4.09	4.09
Denmark	4.28	4.33	4.29	4.29	4.30	4.30	4.30	4.26	4.30	4.31
Finland	4.23	4.23	4.22	4.24	4.23	4.16	4.16	4.18	4.21	4.21
France	4.08	4.09	4.08	4.07	4.07	4.06	4.05	4.03	4.03	4.02
Germany	4.22	4.23	4.20	4.19	4.22	4.17	4.16	4.16	4.14	4.15
Greece	3.64	3.61	3.68	3.71	3.83	3.71	3.75	3.87	3.84	3.90
Ireland	3.70	3.74	3.73	3.73	3.75	3.77	3.75	3.79	3.82	3.83
Italy	3.65	3.65	3.66	3.67	3.67	3.71	3.69	3.71	3.72	3.74
Luxembourg	4.19	4.17	4.18	4.20	4.20	4.18	4.21	4.19	4.21	4.18
Netherlands	4.40	4.43	4.43	4.43	4.45	4.40	4.40	4.38	4.37	4.36
Portugal	3.80	3.83	3.84	3.83	3.85	3.85	3.84	3.85	3.86	3.83
Spain	3.75	3.75	3.75	3.74	3.74	3.75	3.74	3.72	3.71	3.68
Sweden	4.18	4.20	4.17	4.22	4.25	4.25	4.22	4.23	4.20	4.24
UK	4.01	3.99	3.98	3.96	3.99	4.02	4.04	4.05	4.06	4.00
Cyprus	3.49	3.49	3.49	3.49	3.49	3.61	3.66	3.64	3.57	3.59
Czech Rep.	3.88	3.88	3.88	3.86	3.89	3.80	3.80	3.78	3.86	3.75
Estonia	3.87	3.95	4.06	4.13	4.13	4.09	4.06	4.04	4.03	4.04
Hungary	3.73	3.73	3.73	3.73	3.73	3.57	3.66	3.66	3.69	3.71
Latvia	4.08	4.08	4.08	4.11	4.16	4.25	4.26	4.31	4.29	4.31
Lithuania	3.96	3.99	4.00	4.09	4.09	4.11	4.18	4.13	4.14	4.15
Malta	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.18	3.18
Poland	3.90	3.90	3.90	3.91	3.96	3.98	3.92	3.95	3.92	3.97
Slovakia	3.61	3.71	3.71	3.69	3.77	3.76	3.72	3.77	3.76	3.73
Slovenia	4.15	4.15	4.14	4.14	4.16	4.15	4.13	4.11	4.09	4.09
Bulgaria	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.62	3.60	3.60
Romania	3.61	3.61	3.61	3.61	3.59	3.65	3.69	3.71	3.72	3.76
EU-27	4.05	4.05	4.04	4.04	4.06	4.04	4.04	4.04	4.04	4.04
EU-15	4.07	4.08	4.07	4.06	4.08	4.07	4.06	4.06	4.06	4.06
EU-10					3.94	3.93	3.91	3.92	3.92	3.95
EU-02								3.67	3.67	3.70

Protein content	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	3.36	3.4	3.39	3.39	3.4	3.39	3.37	3.4	3.39	3.37
Belgium	3.36	3.35	3.32	3.26	3.24	3.17	3.35	3.39	3.39	3.35
Denmark	3.41	3.42	3.42	3.43	3.43	3.42	3.4	3.43	3.41	3.42
Finland	3.25	3.25	3.25	3.25	3.33	3.33	3.33	3.34	3.33	3.35
France	3.13	3.13	3.13	3.14	3.28	3.17	3.18	3.19	3.18	3.18
Germany	3.38	3.35	3.39	3.3	3.41	3.39	3.42	3.46	3.43	3.45
Greece	3.35	3.36	3.37	3.38	3.4	3.4	3.39	3.4	3.4	3.38
Ireland	3.23	3.23	3.23	3.23	3.28	3.17	3.25	3.24	3.27	3.31
Italy	3.27	3.28	3.27	3.3	3.3	3.3	3.3	3.32	3.34	3.33
Luxembourg	3.36	3.37	3.37	3.38	3.39	3.4	3.4	3.41	3.4	3.37
Netherlands	3.23	3.23	3.23	3.23	3.23	3.23	3.23	3.23	3.24	3.24
Portugal	3.2	3.2	3.2	3.2	3.18	3.2	3.1	3.11	3.21	3.2
Spain	3.34	3.34	3.34	3.34	3.32	3.36	3.34	3.34	3.35	3.35
Sweden	3.06	3.14	3.21	3.23	3.28	3.32	3.29	3.3	3.31	3.33
UK	3.28	3.29	3.3	3.3	3.26	3.27	3.27	3.31	3.28	3.27
Cyprus	3.36	3.36	3.36	3.36	3.36	3.4	3.37	3.33	3.33	3.41
Czech Rep.	3.25	3.25	3.25	3.39	3.4	3.38	3.35	3.37	3.35	3.36
Estonia	3.42	3.41	3.4	3.4	3.43	3.42	3.41	3.42	3.41	3.44
Hungary	3.09	3.04	3.03	3	3.2	3	2.96	3.3	3.3	3.29
Latvia	3.24	3.27	3.28	3.26	3.29	3.3	3.3	3.31	3.34	3.36
Lithuania	3.49	3.52	3.53	3.27	3.26	3.25	3.3	3.27	3.29	3.26
Malta	3.18	3.18	3.13	3.19	3.3	3.31	3.33	3.35	3.34	3.33
Poland	3.47	3.46	3.47	3.48	3.49	3.49	3.49	3.5	3.5	3.49
Slovakia	3.23	3.23	3.23	3.23	3.19	3.2	3.2	3.2	3.21	3.24
Slovenia	3.28	3.28	3.32	3.35	3.38	3.38	3.38	3.4	3.38	3.4
Bulgaria	3.17	3.17	3.17	3.17	3.17	3.17	3.17	3.23	3.33	3.33
Romania	3.22	3.27	3.25	3.25	3.28	3.28	3.25	3.28	3.27	3.28
EU-27	3.28	3.29	3.29	3.29	3.31	3.3	3.3	3.33	3.33	3.34
EU-15	3.28	3.29	3.29	3.29	3.32	3.3	3.31	3.32	3.33	3.33
EU-10					3.33	3.31	3.31	3.35	3.35	3.36
EU-02								4.87	4.96	4.97

Source: DG AGRI (various years).

Table 2.18 shows the trends in raw milk producer prices between 2001 and 2009. On average, producer prices have been higher in the EU-15 than in the EU-10 and the EU-02, with Cyprus being the only new MS with relatively high producer prices. Among Member States of the EU-15, those with the higher prices are Finland, Greece, Italy and France.

Table 2.18 Producer prices for raw cows' milk by Member State, 2001-2009, €/t

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	334	316	297	296	295	300	340	388	290
Belgium	320	291	273	288	276	270	346	320	237
Denmark	343	342	326	306	291	290	317	372	275
Finland	355	362	362	354	346	359	376	457	396
France	317	308	304	316	306	293	315	363	298
Germany	342	311	297	292	286	270	326	335	237
Greece	330	340	344	358	361	350	387	432	377
Ireland	289	269	275	289	284	272	349	355	247
Italy	386	388	352	350	338	321	344	374	306
Luxembourg	343	334	327	323	308	305	361	376	268
Netherlands	341	328	315	294	287	278	328	359	268
Portugal	328	330	329	334	286	274	317	363	290
Spain	307	287	287	308	303	296	353	379	292
Sweden	322	332	338	321	295	287	313	360	262
United Kingdom	301	266	255	268	267	256	294	315	258
Cyprus			367	396	401	404	415	496	511
Czech Rep.			238	246	271	269	295	329	226
Estonia			185	239	254	243	269	297	211
Hungary			274	248	255	236	286	322	215
Latvia			135	174	212	235	264	276	187
Lithuania			139	169	198	204	244	255	182
Malta			413	400	349				
Poland			159	193	249	254	295	303	222
Slovakia			215	229	246	250	290	323	209
Slovenia			294	284	262	264	280	330	25
Bulgaria							250	315	254
Romania									204
EU-15[1]	331	320	312	313	302	295	338	370	287
EU-10[1]				172	180	157	188	209	159
EU-02[1]									223

Notes: The prices for the EU-15, EU-10 and EU-02 have been calculated as simple arithmetic averages of the prices per relevant MS.

Source: DG AGRI (various years).

There are differences in milk price trends for the EU-15 and the EU-10. Between 2000 and 2006, milk prices declined in 13 out of the 15 MS in EU-15, with the decline ranging from -3% in Spain to -21% in Germany. By contrast, EU-10 milk prices increased substantially, approaching the price level of the EU-15. During 2006 and 2008, however, prices increased in all MS with price increases varying from 19% (Belgium, Poland) to 36% (Hungary). Thereafter, in 2009, prices dropped sharply, with significant consequences for shorter-term profitability and causing great concern in the milk-producing sector.

2.2.2 Supply of dairy products in the EU

This section reports the trends in production of drinking milk, cheese, butter, whole milk powder (WMP) and skim milk powder (SMP) over the last decade. The reader should note that regional EU aggregates are not always complete given the lack of data at MS level for certain commodities. Furthermore, for drinking milk and cheese, the information concerns only the produced quantities.

Butter

Table 2.19 Production of butter in the EU MS, 2000-2010, 1000 t

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Austria	36	36	33	33	32	30	32	34	33	32	33
Belgium	121	99	100	114	117	110	104	101	87	91	81
Denmark	46	47	49	53	47	44	38	36	38	37	34
Finland	62	61	61	58	58	57	57	55	54	56	52
France	452	455	456	435	418	420	408	412	434	416	408
Germany	425	420	435	452	444	455	438	445	465	453	449
Greece	1	1	1	1	1	1	1	1	1	1	1
Ireland	144	140	142	147	144	145	141	143	126	123	138
Italy	133	122	124	124	121	130	120	115	106	107	95
Luxembourg											
Netherlands	128	132	119	117	102	100	106	129	131	128	126
Portugal	25	24	28	26	26	27	29	28	30	29	26
Spain	39	32	55	52	50	58	46	38	40	37	38
Sweden	42	37	42	30	41	34	30	27	28	30	24
United Kingdom	132	126	136	131	122	130	117	121	113	120	119
Cyprus						1					
Czech Rep.					48	42	41	37	36	34	27
Estonia					8		7	7	7	9	
Hungary					10	11	8	8	8	8	9
Latvia					5	7	7	7	6	6	5
Lithuania					16	13	14	14	12	15	11
Malta											
Poland						173	159	161	157	140	139
Slovakia					11	8	9	10	10	8	8
Slovenia					4			3	2	2	3
Bulgaria								2	1	1	1
Romania								8	8	10	10
Total	1,786	1,732	1,781	1,773	1,825	1,996	1,912	1,942	1,933	1,893	1,837
EU-15	1,786	1,732	1,781	1,773	1,723	1,741	1,667	1,685	1,686	1,660	1,624
EU-10						255	245	247	238	222	202
EU-02								10	9	11	11

Source: Eurostat.

As shown in Table 2.19, EU butter production remained relatively stable in the period 2000-2003, after which it increased due to enlargement, but towards the end of the period it began to decline again. France and Germany produced most of the EU's butter (average market shares are 23% and 24% respectively), followed by a second group of relatively larger producers, namely Ireland, the Netherlands, Italy, United Kingdom and Poland. Production in EU-15 declined by about 1.4% per annum since 2005. In the EU-10 during the period 2005-2010 the annual decline was about 4.5%. This is related to the butter price decline on the one hand to the increased demand for the milk fat component associated with the increasing cheese production and on the other hand.

Table 2.20 Prices of butter by Member State, 2001-2010, €/t

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Austria	3,339	3,100	3,083	3,030	2,911					
Belgium	3,189	3,012	3,072	3,025	2,786	2,570	3,385	2,854	2,566	3,382
Denmark	3,771	3,781	3,782	3,777	3,530	3,086	3,308	3,475	2,852	3,336
Finland	3,121	2,975	3,024	2,987	2,782	2,510	2,783	3,003	2,361	2,796
France	3,088	2,946	3,000	2,967	2,742	2,494	3,244	2,605	2,411	3,307
Germany	3,354	3,019	3,069	2,997	2,794	2,590	3,491	2,721	2,344	3,468
Greece	4,646	4,933	5,113	5,404	5,551					
Ireland	2,959	2,930	2,936	2,878	2,645	2,405	3,059	2,468	2,270	3,124
Italy	2,361	2,192	2,638	2,775	2,600	1,863	3,937	2,883	2,473	3,106
Luxembourg										
Netherlands	3,160	3,015	3,050	3,006	2,792	2,530	3,380	2,622	2,478	3,453
Portugal			2,915	2,879	2,621	2,377	2,811	2,520	2,305	3,273
Spain	2,981	2,941	2,953	2,831	2,481	2,271	2,494	2,502	2,179	2,800
Sweden	3,501	3,616	3,637							
United Kingdom	3,053	2,909	2,942	2,942	2,798	2,552	3,379	2,785	2,334	3,544
Cyprus										
Czech Rep.				2,939	2,891	2,524	3,120	2,737	2,393	3,330
Estonia				2,648	2,549					
Hungary				3,366	3,284	3,246	3,805	4,573	4,214	4,415
Latvia				2,547	2,587	2,566	3,278	3,198	2,512	3,197
Lithuania				2,336	2,632					
Malta										
Poland				2,567	2,584	2,453	3,012	2,555	2,427	3,205
Slovakia				2,771	2,897	2,799	3,380	3,373	3,064	3,928
Slovenia				3,128	3,148					
Bulgaria										
Romania										
EU-15	3,271	3,182	3,230	3,192	3,003	2,477	3,206	2,767	2,416	3,235
EU-10				2,788	2,821	2,265	2,766	2,739	2,435	3,615
EU-02										

Notes: The prices for the EU-15 and EU-10 have been calculated as simple arithmetic averages of the prices per relevant MS.

Source: DG AGRI (AgriView) (various years).

Table 2.20 shows the evolution of butter (market) prices in the EU. Butter prices declined in both the EU-15 during 2000-2006 and the EU-10 during 2004-2006, with the strongest decline between 2004 and 2006. After 2006 butter prices increased sharply, peaking in 2007. They declined strongly in the wake of the economic crisis, but have rebounded since. Although there are differences between Member States, for most Member States the price movements are highly correlated. In the reporting period, the difference between the average butter price in EU-15 and the lower average butter price in EU-10 has gradually disappeared.

Cheese

Table 2.21 shows that Germany, France, Italy, the Netherlands and Poland have been the EU's largest cheese producers, with average shares in total production of 26%, 23%, 14%, 9% and 8%, respectively.

Table 2.21 Production of cheese in the EU by Member State, 2000-2010, 1000 t

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Austria	115	130	139	146	140	144	148	152	148	146	153
Belgium	58	60	60	60	63	60	65	68	68	69	72
Denmark	306	318	320	326	336	355	335	346	324	324	292
Finland	98	103	103	103	97	97	100	102	107	104	109
France	1,606	1,652	1,659	1,654	1,698	1,672	1,689	1,726	1,725	1,712	1,826
Germany	1,688	1,764	1,764	1,816	1,865	1,924	1,995	2,019	2,023	2,086	2,169
Greece	10	9	10	27	22	17	12	12	17	27	22
Ireland	99	123	116	112	118	119	137	140	174	162	
Italy	927	949	972	987	1,022	1,034	1,049	1,038	1,047	1,072	1,022
Luxembourg											
Netherlands	672	638	637	654	671	664	711	730	722	714	740
Portugal	57	59	60	58	57	58	56	57	56	54	57
Spain	111	119	124	133	133	136	134	128	127	126	124
Sweden	127	125	128	125	118	118	119	109	114	106	103
United Kingdom	332	387	364	345	352	385	398	374	373	357	371
Cyprus						1	2	2	1	2	
Czech Rep.					127	118	113	113	109	107	109
Estonia					22	28	33	32	36	37	38
Hungary					65	77	73	72	73	75	72
Latvia					29	32	33	35	34	29	33
Lithuania					61	64	69	91	107	94	99
Malta											
Poland						528	584	607	637	628	668
Slovakia					32	39	43	40	34	31	25
Slovenia					24	22	20	19	20	18	19
Bulgaria								73	64	61	58
Romania								62	65	64	59
Total	6,204	6,436	6,456	6,546	7,052	7,692	7,918	8,147	8,205	8,205	8,240
EU-15	6,204	6,436	6,456	6,546	6,692	6,783	6,948	7,001	7,025	7,059	7,060
EU-10						909	970	1,011	1,051	1,021	1,063
EU-02								135	129	125	117

Source: Eurostat.

Poland, Estonia and Lithuania increased their share in EU's total production, whereas big producers like Germany, France, Italy and the Netherlands lost part of their initial market share over the decade. A comparison of the production of cheese (Table 2.21) with the production of raw milk (Table 2.12) shows that cheese production increased much faster (about 2.9% per annum for the EU total) than milk deliveries (about 0.6% per annum). In the EU-10, growth in cheese production was stronger (more than 3% per annum) than in the EU-15 (average annual growth over the period 2000-2010 was about 1.3%, but with tear-on-year changes clearly declining over time). Within the EU-15, Greece and Ireland showed the strongest percentage increases in production over time (about 8% and 5.5% per annum, respectively), whereas within the EU-10 cheese production expanded even faster in Estonia (about 9%

per annum) and Lithuania (about 8% per annum). Member States whose production slightly declined were Denmark, Sweden, Czech Republic, Slovakia and Slovenia, together with Bulgaria and Romania.

Cyprus, Greece and Slovenia produced less cheese from cows' milk compared to the other Member States. Greece is nonetheless an important producer of cheeses from sheep and goat milk.

As cheese is not a homogeneous commodity, it is not possible to compare prices of cheese across the EU.

Drinking milk

Drinking milk relates only to milk intended for direct consumption, normally in containers of 2 litres or less. As Table 2.22 shows, Germany, followed by France, Italy, Spain, Sweden and the United Kingdom were the main producers of drinking milk in the EU between 2000 and 2010.

Table 2.22 Production of drinking milk in EU Member States, 2000-2010, 1000 t

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Austria	521	591	632	649	704	701	786	813	710	715	727
Belgium	664	665	625	619	609	607	638	651	664	660	696
Denmark	518	520	511	498	487	460	467	486	511	483	471
Finland	735	733	719	711	710	732	733	735	738	734	731
France	3,813	3,990	3,935	3,867	3,866	3,806	3,792	3,811	3,676	3,496	3,515
Germany	5,424	5,485	5,524	5,821	5,805	5,783	5,971	5,923	5,132	5,288	5,276
Greece	417	412	400	417	416	423	428	416	434	435	453
Ireland	546	556	553	546	540	536	539	511	536	510	508
Italy	2,944	2,944	2,952	2,911	2,871	2,982	2,884	2,852	2,760	2,690	2,714
Luxembourg											
Netherlands	968	877	821	793	793	838	778	758	718	710	
Portugal	877	857	864	884	899	957	954	919	882	837	832
Spain	3,559	3,707	3,775	3,750	3,813	3,672	3,533	3,519	3,612	3,600	3,540
Sweden	1,024	1,021	1,023	1,012	1,009	992	952	926	915	908	908
United Kingdom	6,826	6,825	6,896	6,835	6,781	6,748	6,804	6,793	6,811	6,735	6,937
Cyprus						77	79	81	78	76	
Czech Rep.					515	587	608	619	611	681	637
Estonia					73	79	83	83	82	89	94
Hungary					586	566	522	526	415	387	362
Latvia					92	100	104	104	99	72	71
Lithuania					75	74	81	81	86	88	88
Malta					29	28	28				
Poland						1,373	1,347	1,335	1,358	1,462	1,471
Slovakia					290	245	236	249	239	260	275
Slovenia					179	179	156	165	156	143	163
Bulgaria								53	53	52	62
Romania								184	199	222	223
Total	28,836	29,183	29,230	29,313	31,142	32,545	32,503	32,631	31,525	31,333	30,751
EU-15	28,836	29,183	29,230	29,313	29,303	29,237	29,259	29,151	28,099	27,801	27,305
EU-10						3,308	3,244	2,243	3,174	3,258	3,161
EU-02								237	252	274	285

Source: Eurostat.

Drinking milk production developed differently in the EU-15 and the EU-10 over the period shown. In the EU-15, annual production slightly declined (by about 0.5% per annum) and only Austria, Belgium, Greece and the UK had higher levels at the end of the period than at the beginning. The strongest decline was for the Netherlands (on average about 3% per annum). For the EU-10, the average annual growth rate was strongly positive (about 9% per annum) and only in Hungary, Slovakia and Slovenia did production slightly decline. A similar upward trend is observed for the EU-02.

Skimmed milk powder (SMP)

Production of SMP declined over the period 2000 to 2010 in most of the EU MS (Table 2.23). This reflects the shift in product mix, with the production of cheese and fresh dairy products expanding relative to that of butter, WMP and SMP, reduced export prospects and declining use of SMP in feed. Germany and France have been again the biggest SMP producers in the EU.

Table 2.23 Production of skim milk powder by Member State, 2000-2010, 1000 t

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Austria	12	7	10	9	6	7	4	4	3	6	7
Belgium	67	56	83	84	73	72	65	77	59	75	76
Denmark	38	40	42	44	18	15	27	19	18	20	28
Finland	24	20	20	17	21	21	18	15	8	17	17
France	279	247	308	278	230	275	267	252	287	331	318
Germany	335	306	313	323	242	257	191	232	227	286	259
Greece											
Ireland	79	86	97	79	66		69	83			
Italy											
Luxembourg											
Netherlands							50	43	55	64	65
Portugal	10										
Spain	4	7	20	16	4	5	1	1	5	11	11
Sweden	42	39	34	35	36	16	13	16	17	27	25
United Kingdom	83	71	87	115	88	69					
Cyprus											
Czech Rep.					31	32	19	23	21	18	14
Estonia					11	9	7				5
Hungary					3	1					
Latvia					3						
Lithuania					12				10	21	12
Malta											
Poland						140	124	120	114	98	79
Slovakia					7	6	6	8	7	4	2
Slovenia					3						
Bulgaria											
Romania								5	3	2	
Total	973	879	1,014	1,000	854	925	861	898	834	980	918
EU-15											
EU-10											
EU-02											

Source: Eurostat.

The SMP prices declined by 15% on average from 2001 to 2002, and remained rather stable over the period 2002-2006 (Table 2.24). After 2006, the SMP price strongly increased (on average by 30%) in 2007 (peak). After 2007 the SMP price strongly declined again, and fell below its long-run average value of €2000/tonne. Although there are differences between Member States, price movements are highly correlated between most Member States .

Table 2.24 Prices of skim milk powder by Member State, 2001-2009, €/t

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	2,574	2,138	2,118	2,100	2,120				
Belgium	2,386	2,027	2,061	2,073	2,008	2,137	3,242	2,258	1,827
Denmark	2,404	2,086	2,104	2,080	2,063	2,109	3,052	2,643	1,870
Finland	2,339	1,934	1,943	1,958	1,969				
France	2,351	2,001	2,040	2,076	2,029	2,129	3,278	2,214	1,795
Germany	2,369	2,045	2,071	2,088	2,034	2,137	3,261	2,284	1,780
Greece									
Ireland	2,176	1,972	2,020	1,992	1,920	1,948	2,980	2,093	1,704
Italy									
Luxembourg									
Netherlands	2,320	1,993	2,031	2,044	1,968	2,125	3,165	2,125	1,758
Portugal			1,870						
Spain	2,571	2,118	1,960	2,105	2,195				
Sweden	2,183	2,177	2,138	2,115	2,091	2,139	2,755		
United Kingdom	2,872	2,268	2,210	2,241	2,142	2,050	2,944	2,458	1,753
Cyprus									
Czech Rep.				1,929	1,937	2,007	2,705	2,326	1,646
Estonia				1,875	1,879				
Hungary				2,554	2,080	3,760	4,052	3,815	3,237
Latvia				1,938	1,981	2,083	2,897	3,212	2,307
Lithuania				1,800	2,013				
Malta									
Poland				1,830	1,900	1,982	2,933	2,132	1,617
Slovakia				1,852	1,979	2,038	2,963	2,680	2,111
Slovenia				3,155	3,182				
Bulgaria									
Romania									
EU-15	2,413	2,069	2,047	2,079	2,049	2,097	3,085	2,296	1,784
EU-10				2,117	2,119	2,374	3,110	2,833	2,184
EU-02									

Notes: The prices for the EU-15, EU-10 and EU-02 have been calculated as simple arithmetic averages of the prices per relevant MS.

Source: DG AGRI (AgriView) (various issues).

Whole milk powder (WMP)

Trends in the production of whole milk powder (WMP) are shown in Table 2.25. Production declined in France and Germany – the two bigger producers in the EU – while it increased in Denmark and in the Netherlands. This reflects the relative increase in demand for high value added products (e.g. cheeses), in which France is particularly specialised. At the same time, it reflects the competition in high quality whole milk powder in and outside the EU.

The fragmentation of the available data for the new Member States does not allow any conclusion on the evolution of their WMP production.

Table 2.25 Production of whole milk powder by EU Member State, 2000-2010, 1000 t

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Austria	4	2		1	1	3	3	3	2	1	
Belgium	70	84	74	72	75	80	71	71	94	68	69
Denmark	97	88	81	82	87	94	91	93	95	111	119
Finland					2	2	2	3	3	3	4
France	258	241	235	206	198	193	158	145	165	123	124
Germany	185	167	154	154	162	161	157	170	90	80	84
Greece											
Ireland	100	85	81	97							
Italy											
Luxembourg											
Netherlands							108	110	127	139	135
Portugal	9										
Spain	12	10	8	9	7	6	8	5	4	2	2
Sweden		6	5	6	12	32	37	36	40	31	23
United Kingdom	105	87	105	102	80	52					
Cyprus											
Czech Rep.					19	17	16	14	16	11	10
Estonia											
Hungary											
Latvia					2						
Lithuania					4				6	2	3
Malta											
Poland						54	37	39	45	30	26
Slovakia					5	7				3	2
Slovenia											
Bulgaria											
Romania								4	3	2	2
Total	840	770	743	729	654	701	688	693	690	606	603
EU-15											
EU-10											
EU-02											

Source: Eurostat.

WMP prices declined from 2001 to 2002 by about 8% in EU-15, after which it remained fairly stable over the period 2002-2006 at a level of about €2500/tonne (Table 2.26). After 2006, WMP prices strongly increased (by 35%) and then dropped sharply in 2009. Although there are differences between Member States, for most Member States the price movements are highly correlated.

Table 2.26 Prices of whole milk powder by Member State, 2001-2009, €/t

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	3,012	2,639	2,601	2,685	2,748				
Belgium	2,798	2,494	2,560	2,579	2,439	2,417	3,473	2,773	2,219
Denmark	2,840	2,517	2,541	2,511	2,405	2,308	3,005	2,692	2,045
Finland	2,775	2,572	2,434	2,470	2,424				
France	2,639	2,436	2,484	2,494	2,382	2,367	3,393	2,734	2,125
Germany	2,915	2,509	2,551	2,544	2,426	2,407	3,405	2,661	2,029
Greece									
Ireland	2,548	2,395	2,430	2,380	2,274	2,188	3,183	2,343	1,990
Italy									
Luxembourg									
Netherlands	2,765	2,464	2,500	2,557	2,411	2,371	3,328	2,693	2,033
Portugal			2,220						
Spain		2,152							
Sweden							3,561	3,145	2,296
United Kingdom	3,265	2,582	2,727	3,023	2,688	2,264	2,928	2,559	1,988
Cyprus									
Czech Rep.				2,315	2,355	2,296	3,032	3,017	2,045
Estonia				2,387	2,331				
Hungary				2,894	2,336			2,980	
Latvia				2,329	2,340	2,226	3,027	3,232	2,079
Lithuania				2,166	2,301				
Malta									
Poland				2,325	2,309	2,281	3,126	2,625	1,891
Slovakia				2,282	2,341	2,329	3,148	2,910	2,324
Slovenia				3,645	3,668				
Bulgaria									
Romania									
EU-15	2,840	2,476	2,505	2,582	2,466	2,332	3,284	2,700	2,090
EU-10				2,543	2,498	2,283	3,083	2,953	2,085
EU-02									

Notes: The prices for the EU-15 and EU-10 have been calculated as simple arithmetic averages of the prices per relevant MS.

Source: DG AGRI (AgriView) (various issues).

To sum up, considering individual production lines, it can be seen that the production of cheese over the period 2000-2010 increased, whereas the production of all three other products declined. This reflects a switch in the product mix from industrial and bulk products to high-value consumer products (cheese and fresh dairy products). Part of the explanation for this substitution is that the total volume of raw milk production was restricted by the quota during 2000-2010. As a result, the expansion of cheese production can only take place if that of other dairy products is reduced, since they all compete for the fat and protein constituents of raw milk.

2.2.3 Consumption and self sufficiency of dairy products in the EU

Table 2.27 shows the per capita consumption of cheese (factory cheese), butter and drinking milk in the EU-27. The per capita consumption remained rather stable with a slightly declining trend for butter and a slightly increasing trend for cheese and drinking milk.

The differences among the Member States reflect the variability in consumption patterns in Europe. Traditional milk producing countries had the highest per capita consumption, such as France, Germany, the UK and Poland. Italy had the highest per capita consumption of cheese, whereas the EU-12 had a lower per capita consumption of drinking milk, which is related as well to the higher on-farm consumption of milk (Table 2.15).

Table 2.27 Per capita consumption of factory cheese (from cows' milk), butter and liquid milk in EU-27, kg

	Cheese			Butter			Drinking milk		
	2000	2005	2009	2000	2005	2009	2000	2005	2009
Austria	18.1	18.6	19.1	4.8	4.8	4.8	64.0	68.0	58.0
Belgium	15.8	14.9	14.2	5.0	3.6	3.1	65.0	58.0	63.0
Denmark	18.8	16.6	16.3	5.3	3.7	3.2	97.0	90.0	90.0
Finland	16.5	18.7	19.1	3.8	2.7	2.7	143.0	140.0	122.0
France	21.0	19.6	19.6	8.7	7.9	7.1	63.0	65.0	61.0
Germany	19.7	19.9	21.3	6.5	6.4	6.3	63.0	64.0	67.0
Greece	24.6	25.6	31.1	0.7	0.7	0.7	40.0	39.0	33.0
Ireland	5.9	6.3	6.0	3.3	3.0	2.7	143.0	129.0	106.0
Italy	22.3	23.1	23.1	2.8	2.8	2.6	52.0	50.0	53.0
Luxembourg	13.8	13.2	13.2	5.1	4.8	4.6	65.0	58.0	62.0
Netherlands	17.9	19.7	20.0	3.3	3.2	3.4	63.0	62.0	60.0
Portugal	10.0	10.4	10.3	1.9	1.6	1.4	86.0	91.0	84.0
Spain	9.3	9.6	9.0	0.9	1.1	1.0	88.0	85.0	80.0
Sweden	16.9	18.2	17.8	3.4	2.7	2.7	115.0	109.0	89.0
UK	9.1	10.9	11.5	4.3	4.0	3.8	116.0	114.0	95.0
Cyprus	11.0	10.6	10.0				99.0	107.0	100.0
Czech Rep.	13.9	15.7	16.7	4.1	4.7	4.9	46.0	56.0	63.0
Estonia	12.8	15.6	16.7	2.9	4.6	4.3	42.0	59.0	83.0
Hungary	8.8	5.2	2.6	0.7	0.9	0.8	56.0	51.0	41.0
Latvia	8.3	13.6	13.1	1.7	2.2	2.6	45.0	52.0	48.0
Lithuania	3.2	4.2	4.9	2.6	3.0	2.9	21.0	21.0	24.0
Malta	11.2	10.4	9.2				80.0	72.0	32.0
Poland	12.0	10.4	10.7	5.0	4.5	3.6	69.0	53.0	53.0
Slovenia	11.1	10.2	9.3	2.1	1.5	1.0	125.0	89.0	81.0
Slovakia	5.7	9.1	10.2	2.7	3.5	2.3	60.0	45.0	48.0
Bulgaria		4.8	5.6		0.3	0.5		27.0	27.0
Romania	1.8	2.9	2.9	0.3	0.5	0.5		112.0	119.0
EU-27	15.0	15.9	16.2	4.3	4.0	3.7	69.0	77.0	76.0

Notes: The data do not consider on-farm consumption

Source: Productschap Zuivel (2009).

The balance of production and consumption can be used to construct a production-use ratio for each product, which is an indicator of the EU's degree of self-sufficiency[3] for that product. As Table 2.28 shows, self-sufficiency for all products and years exceeded 100%, indicating that the EU market cannot absorb all the cheese, butter, WMP and SMP produced in the EU. For example, the EU's self-sufficiency ratio fluctuates between 105 and 106, which indicates that the net exportable surplus is 5-6% of domestic consumption needs. The self-sufficiency ratio of milk powders and in particular of WMP is higher. The self-sufficiency ratios for the other three products shown in the table have fluctuated more over the period shown than those for cheese. This reflects the fact that processors can switch their product mix more easily during the year between producing butter and SMP, or whole milk powder, in response to market conditions.

Table 2.28 Self-sufficiency ratio (in %) for the EU-27, 2000-2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Butter	105	106	110	111	113	113	108	106	105	105
Cheese	105	105	106	106	106	106	106	106	106	106
SMP	122	122	122	129	135	123	108	127	125	135
WMP	254	232	252	251	263	234	219	185	223	236

Source: own calculations based on DG AGRI (various years).

2.2.4 Structure of the processing industry

This section uses information from Eurostat, the own case studies and on a report presented at the EU's High Level Expert Group on milk (European Commission, 2009a).

There are currently around five thousand dairy processors in the EU, of which about 55% are categorized as being small processors. That is, the volume of raw milk they process per year does not exceed 5,000 t. The remaining 45% consist of 26% classified as medium-sized (their volume of raw milk processed is between 5,001 and 100,000 t), and 18% classified as large (their volume of raw milk processed exceed 100,001 t) (European Commission, 2009a). It should be noted that the largest dairy processors tend to significantly exceed the level of 500,000 tonnes.

Table 2.29 shows the number of dairy enterprises[4] and the total amount of milk processed per Member State. For 2006, the total number of dairy processors in EU-27 was 5800 of which about 80% were located in the EU-15 and the remaining 20% in the EU-10 and the EU-02. In all EU-15 Member States except Portugal, the Netherlands and Sweden, the number of dairy enterprises declined over time (in the UK and Belgium by approximately 5% per annum, but at lower rates of decline for other EU-15 Member States). The picture is less uniform in EU-12. In Estonia, Latvia and Slovakia the number of enterprises increased in the period 2003-2006, whereas in the Czech Republic, Hungary, Lithuania and Slovenia declines in the number of dairy enterprises are observed. For those Member States where currently the dairy industry consists of a large number of relatively small-sized enterprises, this process was strong. By contrast, in Member States where the processing sector was already highly consolidated, such as the Netherlands, the number of enterprises could even increase. Dividing the annual milk collection with the corresponding number of dairy enterprises gives the average volume of raw milk processed per processing firm. The estimated average milk collection by enterprise in terms of volumes varies from 3 thousand tonnes in Bulgaria and Romania to almost 740 thousand tonnes in the Netherlands. During the period 2003-2006 the number of enterprises in Czech Republic, Estonia and Lithuania declined by 6%, 4% and 9% respectively. The rates of decline for Poland and Romania are in the same order of magnitude (6% annual decline in number of enterprises between 2006 and 2009).

3 Self-sufficiency = 100 × {[domestic production/total consumption] = 1 + [exports – imports + change in stocks]/total consumption}. The amount by which self-sufficiency exceeds 100% shows net exports and net additions to stocks of the product as a percentage of domestic use.

[4] The term enterprise follows the definition of the Council Regulation (EEC) No 696/93 and refers to milk processing firms which are identified as legal units. The reader should note that an enterprise may have one or more factories processing milk.

Table 2.29 Dairy enterprises, volume of annual milk production and average milk processed per firm, 1000 t

	Number of enterprises				Processed milk (1000t)			
	2000	2003	2006	2009	2000	2003	2006	2009
Austria	96	86	79	79	2657	2644	2674	1660
Belgium	80	69	66	50	3125	2830	*2846*	2945
Germany	218	201	190	194	26814	27431	27715	28615
Denmark	31	26	23	27	4495	4518	4480	4716
Spain	597	570	582	616	*6609*	6605	6586	5150
Finland		23	19	16		2398	2348	
France	531	468	441	414	*10780*	10910	10576	6858
Greece		649	877	815		1362	1429	1385
Ireland	66	63	59		*5160*	5310	5232	
Italy	1734	1707	1601	1439	9390	9175	9183	8627
Luxembourg	4	3			180	176		
Netherlands	15	14	16		*10340*	10373	10657	
Portugal	140	188	200	178	746	666	685	
Sweden	10	10	10	14	3297	3206	3130	3972
United Kingdom	729	622	524	456	*14090*	14195	13386	
EU-15		4699				101799		
Cyprus				79				190
Czech Republic		55	46	38		2601	2393	1970
Estonia		23	26	18		485	606	412
Hungary		53	41	75		1719	1450	530
Lithuania		20	13	11		954	1011	593
Latvia		43	67	65		436	592	236
Malta		1	1			40	41	
Poland			226	190			8195	8154
Slovenia		95	7			499	389	
Slovakia		32	40	49		973	962	593
Bulgaria				170				529
Romania			410	337			1133	876
EU-12								
EU-27								

Notes: Processed milk refers to milk delivered to dairies.

Source: Eurostat.

With respect to the producer-processor relationship, the report presented at the EU's High Level Expert Group on milk (European Commission, 2009a), indicated that about 58% of the total raw milk deliveries were made by members of cooperatives to their cooperatives (mainly in EU-15). About 20% was delivered based on individual contracts between producers and private processors. There can be overlap between cooperatives and private processors when cooperatives sign contracts with non-members or sell part of their milk intake to private processors. About 8% of the total raw milk was delivered through producer delivery groups. These groups take various forms and names, and range from delivery groups and producer organisations to sales cooperatives. They have been explicitly identified in Cyprus, Germany, Hungary and Spain. It should be noted that in some cases producer groups are classified as cooperatives and in other cases as private contracts. A fourth category, 'other types of producer-processor relations', accounts for 2.5% of total EU milk deliveries, and reflects either lack of organisation of the milk market or ways of introducing more flexibility into the market. Spot markets play a rather residual role for milk that has not been contracted or delivered to cooperatives. It should be noted that Member States could not identify the type of contractual arrangement under which it was delivered. In particular, for France, Romania, Greece and Slovakia, the non-classifiable share is large. For most of the Member States the contractual arrangements have remained rather unchanged, while the importance of the cooperatives increased.

Cooperatives are obliged to buy all the milk delivered by their members. Milk prices are determined by the governing bodies of the cooperative and tend to be indicative prices (often one month ahead), which are adjusted later. The basic price is usually the same for all members, but is further differentiated by accounting for the fat/protein content of the milk delivered, and subject to quality and quantity premiums. As regards the milk sold under private contractual arrangements, these contracts are usually for one year, with price and volume fixed in the contract. In Member States where cooperatives play an important role, the conditions of private contracts reflect those of the cooperatives (e.g. being long-term (> 1 year), with similar price setting mechanisms and an undertaking to accept all the milk delivered) (European Commission, 2009a). At the same time, it was indicated by several Member States that unwritten and much less formal contracts can play an important role in the private sector.

2.3 Evolution of EU dairy farming

This section places milk production in the context, first, of total livestock grazing activity. This is done in order to understand the relative importance of dairy farming compared with other forms of livestock management. Second, dairy farming is considered from a territorial point of view in connection with Less Favoured Areas, which may have a marginal character for other forms of agriculture but are often well suited for grazing, and for milk production in particular.

2.3.1 Livestock farming and specialist dairy production in Member States

In the EU-15, EU-10 and EU-02 alike, total farm numbers have been gradually declining, and this trend is expected to continue (Nowicki et al., 2009). The numbers of total farm units by Member State for 2000 and 2007 given in Table 2.30 reflect a general trend to increase farm scale and in doing so to exploit the economies of scale. This trend is also observed in the dairy sector. However, in the EU-15 except for Germany and Portugal, there was a steeper decline in the number of specialist dairy farming compared to all types of farm. In some cases (Belgium, France, Netherlands) this decline was relatively minor, in others (Austria, Denmark, Spain, Finland, Ireland, Luxembourg) it was more pronounced, and in a few it was quite significant (Sweden, UK). This reflected a relatively strong structural change taking place in dairy farming, characterised by significant scale increases. In the EU-10, there appears to be restructuring in some Member States, with an increase in the share of specialist dairy farming for Latvia and Lithuania, which is in contrast to the steady decline in Estonia, Poland, Slovenia, Slovakia. For the EU-02, one sees the positive effects of restructuring with regard to specialist dairy farming in view of accession to the EU. Cyprus, Greece and Malta have a very small specialist dairy sector, and their share seems stable. Table 2.30 shows that between 2000 and 2007 the evolution of the share of specialist dairying in the total number of farms per MS, in contrast to the other farm types of holdings with livestock, did not follow any particular pattern. There was, moreover, country-specific diversity in general in the evolution of livestock activity. Table 2.30 compares four types of farms:

- TF 41: Specialist dairy farms: farms in which at least two thirds of the standard gross margin comes from the production of milk.
- TF 42: Specialist cattle rearing and fattening: farms in which at least two thirds of the standard gross margin comes from the production of meat.
- TF 43: Cattle dairying, raising and fattening combined: farms where the production is based on cattle.
- TF 44: Sheep, goats and other grazing livestock: these farms have no cattle, and they produce both milk and meat.

Some countries had very unbalanced shares in one type of livestock farming or another: For example Austria, Finland, Germany, Luxemburg, Netherlands, Slovakia and Sweden had predominantly more livestock holdings in milk production, while France had a rather balanced distribution of livestock activity across the four types. This share seems not to be related to the total milk output.

Table 2.30 Share of livestock-related farm-types (in %) in total holdings by Member States, 2000 and 2007

	Total (in 1000)		% change 2007 *vs.* 2000	Specialist dairying (TF 41)		Specialist cattle-rearing and fattening (TF 42)		Cattle-dairying, rearing and fattening combined (TF 43)		Sheep, goats and other grazing livestock (TF 44)	
	2000	2007		2000	2007	2000	2007	2000	2007	2000	2007
Austria	199.47	165.42	-0.2	23.9	19.2	6.7	12.0	8.7	7.8	14.9	19.1
Belgium	61.71	48.01	-0.2	14.3	13.7	18.2	18.0	5.9	5.8	7.5	7.5
Bulgaria		493.13			8.6		0.3		0.3		9.2
Cyprus		40.12			0.5		0.0		0.0		4.3
Czech Republic		39.40			4.5		6.5		0.7		14.9
Denmark	57.83	44.62	-0.2	15.0	10.0	1.2	2.9	0.2	0.1	3.2	6.9
Estonia		23.34			10.0		0.6		0.4		19.1
Finland	81.19	68.23	-0.2	26.5	18.0	4.1	2.4	1.4	1.2	4.2	2.3
France	614.00	527.35	-0.1	11.0	10.4	11.8	12.5	1.8	1.7	11.6	11.6
Germany	471.96	370.48	-0.2	19.5	20.0	3.8	7.8	1.8	2.0	11.2	14.2
Greece	817.06	860.15	0.1	0.2	0.3	0.3	0.5	0.1	0.1	5.4	4.7
Hungary	966.92	626.32	-0.4	1.1	0.9	0.1	0.1	0.1	0.0	1.8	2.6
Ireland	141.53	128.24	-0.1	18.6	15.0	51.0	53.2	2.7	1.2	20.1	23.4
Italy	2,153.72	1,679.44	-0.2	2.5	1.6	0.8	1.7	0.1	1.0	7.0	6.5
Latvia	140.84	107.75	-0.2	5.2	20.5	0.0	0.4	0.1	0.7	9.9	8.4
Lithuania		230.27			14.0		0.4		2.5		4.3
Luxembourg	2.81	2.30	-0.2	32.4	27.8	10.0	9.6	5.7	11.7	7.8	10.4
Malta		11.02			0.9		0.0		0.2		2.5
Netherlands	101.55	76.74	-0.2	26.3	24.6	3.6	2.8	1.3	0.5	17.0	23.0
Poland		2,390.96			4.4		0.3		1.8		10.6
Portugal	415.97	275.08	-0.3	3.4	3.5	2.3	3.4	0.6	0.3	5.7	6.6
Romania		3,931.35			3.0		0.1		0.7		4.2
Slovakia	71.04	68.99	0.0	13.1	9.8	1.3	0.6	0.5	0.1	3.3	4.8
Slovenia	86.47	75.34	-0.1	15.0	9.8	14.9	10.2	5.1	6.7	7.6	15.3
Spain	1,287.42	1,043.91	-0.2	3.6	2.6	4.2	4.1	0.7	0.3	6.3	7.8
Sweden	81.41	72.61	-0.1	15.8	8.9	6.4	13.6	0.2	0.1	1.8	15.2
United Kingdom	233.25	299.83	0.3	10.8	5.9	14.5	11.9	0.6	1.1	38.0	26.9

Source: Eurostat (FSS).

Table 2.31 Distribution of all farms with dairy cows by herd size, 2000 and 2007 (number of farms in 1000)

Herd size	1 - 2	3 - 9	10 - 19	20 - 29	30 - 49	50 - 99	≥ 100	Total
Number of farms in 2000								
Austria	11.81	37.06	22.15	5.05	1.27	0.14	0.01	77.47
Belgium	0.56	1.43	3.28	3.70	5.34	3.60	0.29	18.19
Bulgaria[1]	170.08	21.67	2.12	0.54	0.31	0.19	0.10	195.01
Cyprus[1]		0.01		0.01	0.02	0.11	0.11	0.25
Czech Rep.[1]	4.49	1.26	0.69	0.23	0.24	0.35	1.19	8.45
Germany	5.92	24.47	38.09	31.13	31.58	17.58	3.89	152.65
Denmark	0.28	0.36	0.72	1.01	2.92	4.58	1.29	11.16
Estonia[1]	9.27	1.95	0.51	0.18	0.14	0.10	0.25	12.40
Spain	19.46	20.41	17.55	9.21	7.02	3.16	1.02	77.81
Finland	1.05	5.38	11.43	4.59	1.31	0.14	0.01	23.91
France[1]	4.18	4.94	13.30	22.99	44.80	22.37	1.35	113.93
Greece	3.19	4.63	2.01	0.80	0.80	0.49	0.15	12.06
Hungary	21.85	11.04	1.13	0.27	0.17	0.14	0.61	35.19
Ireland	1.26	2.47	4.62	5.43	10.09	6.95	0.99	31.81
Italy	15.14	24.73	14.90	8.23	8.38	6.72	3.51	81.60
Lithuania[1]	150.88	39.52	2.21	0.33	0.20	0.11	0.14	193.39
Luxembourg	0.01	0.03	0.10	0.27	0.65	0.17	0.02	1.23
Latvia	58.07	14.15	1.11	0.23	0.13	0.09	0.10	73.89
Malta[1]	0.02	0.02	0.01	0.02	0.04	0.05	0.01	0.17
Netherlands	1.67	2.56	2.90	3.65	9.25	13.09	1.95	35.06
Poland[1]	593.04	225.04	44.52	7.68	2.27	0.64	0.60	873.80
Portugal	15.15	8.59	3.78	2.19	1.94	1.07	0.27	32.99
Romania[1]	1,151.49	50.23	2.18	0.45	0.25	0.15	0.14	1,204.89
Sweden	0.37	1.06	3.00	3.47	3.88	1.85	0.34	13.96
Slovenia	12.97	11.88	3.01	0.52	0.16	0.04	0.01	28.59
Slovakia	16.58	0.44	0.07	0.02	0.04	0.14	0.65	17.94
United Kingdom	1.67	1.42	1.76	2.23	5.70	11.04	8.04	31.86
EU-27	2,270.46	516.75	197.15	114.43	138.90	95.06	27.04	3,359.66
Number of farms in 2007								
Austria	9.71	18.25	14.54	4.75	1.82	0.34	0.03	49.45
Belgium	0.54	0.98	1.51	2.29	4.07	3.51	0.42	13.32
Bulgaria	98.47	16.69	3.07	1.12	0.87	0.43	0.16	120.82
Cyprus	0.01	0.01	0.01	-	0.02	0.11	0.08	0.24
Czech Rep.	2.54	0.78	0.55	0.21	0.20	0.31	1.04	5.62
Germany	2.89	11.40	21.36	19.15	21.90	19.20	5.18	101.07
Denmark	0.14	0.21	0.24	0.31	0.64	1.34	2.50	5.38
Estonia	4.11	0.97	0.36	0.16	0.12	0.13	0.23	6.08
Spain	7.66	6.61	7.01	5.00	6.05	3.51	1.46	37.29
Finland	0.65	2.12	5.51	3.45	1.99	0.60	0.06	14.39
France	2.55	3.72	7.63	14.72	37.46	24.85	2.19	93.12
Greece	2.05	2.30	1.27	0.74	0.75	0.68	0.23	8.02
Hungary	4.61	5.17	1.21	0.29	0.34	0.12	0.42	12.17
Ireland	0.43	0.72	1.70	2.68	6.48	7.96	1.35	21.32
Italy	9.27	17.99	11.64	5.90	6.60	7.03	4.37	62.79
Lithuania	93.06	24.29	3.67	0.98	0.65	0.34	0.19	123.17
Luxembourg	0.10	0.08	0.08	0.17	0.41	0.24	0.02	1.09
Latvia	31.64	9.07	1.72	0.52	0.34	0.25	0.15	43.69
Malta	0.05	0.02	0.01	0.01	0.03	0.04	0.02	0.19
Netherlands	1.01	1.67	1.55	1.68	4.47	10.88	3.26	24.51
Poland	438.69	137.07	51.18	15.21	6.63	1.65	0.62	651.05
Portugal	4.23	2.75	2.05	1.52	1.58	1.05	0.33	13.50
Romania	939.89	66.30	4.02	1.05	0.56	0.39	0.19	1,012.41
Sweden	0.01	0.22	0.89	1.25	2.17	1.82	0.74	7.10
Slovenia	8.04	7.24	2.68	0.76	0.37	0.10	0.01	19.20
Slovakia	10.25	0.57	0.06	0.03	0.04	0.08	0.51	11.54
United Kingdom	6.19	3.30	1.44	0.94	2.36	6.21	7.69	28.14
EU-27	1,678.79	340.50	146.96	84.89	108.92	93.17	33.45	2,486.67
%change, 2007 vs. 2000	-26.1	-34.1	-25.5	-25.8	-21.6	-2.0	23.7	-26.0

Notes: 1) Data refer to the year 2003

Source: Eurostat (FSS).

There was strong heterogeneity between Member States with respect to the herd size distribution (Table 2.31). For example, in Romania and in Poland the dominant size class was herds with fewer than 10 (and often even no more than 2) dairy cows. In contrast, in Sweden such relatively small dairy farms hardly existed. A comparison of 2000 and 2007 shows that the decline in farm numbers in most Member States was at the expense of the smaller herds, whereas larger herds increased their number. For example, in Austria there were net losses of farms in the first four herd-size groups, but numbers increased in the last three herd-size groups (from 30 cows onwards). In Germany, it is only the two largest herd-size groups (from 50 cows onwards) that register a growth in numbers. However, this pattern does not hold in all Member States. In the United Kingdom, where herd sizes are already much larger than the EU average, there was an increase in the number of herds with 10 cows or less, whereas all other herd-size groups lost herd numbers.

Herd-size distributions are inevitably very skewed, with predominantly more herds among the smaller size-groups and far fewer in the larger-sized groups. However, the distribution of cows or of milk output over herds of different sizes rarely follows this pattern, since the larger cow numbers and higher output of the larger farms partly or fully counteracts the disproportionate weight of the smaller farm numbers.

Table 2.32 Distribution of dairy cows over herds of different size class, 2000 and 2007 (thousand)

Herd size	1 - 2	3 - 9	10 - 19	20 - 29	30 - 49	50 - 99	≥ 100	Total
Number of dairy cows in 2000								
Austria	18.73	208.72	298.68	116.51	44.95	8.88	0.85	697.31
Belgium	0.82	8.66	47.46	88.71	204.04	230.42	35.76	615.86
Bulgaria[1]	210.41	87.83	26.08	11.96	11.06	12.82	15.42	375.58
Cyprus[1]		0.03		0.15	0.58	7.97	17.17	25.96
Czech Rep.[1]	5.66	6.23	9.26	5.36	9.25	25.24	406.85	467.85
Germany	8.89	151.47	547.09	747.27	1,185.37	1,129.28	995.77	4,765.14
Denmark	0.41	2.05	10.57	24.66	115.01	314.80	172.70	640.19
Estonia[1]	11.38	9.26	6.79	4.28	5.25	6.77	76.08	119.80
Spain	26.35	114.18	241.70	216.14	256.11	201.63	186.20	1,242.31
Finland	1.40	36.03	163.83	106.93	46.10	8.57	1.26	364.12
France[1]	5.99	30.14	199.16	566.97	1,682.74	1,405.37	160.60	4,050.96
Greece	4.84	24.07	25.65	18.18	28.72	31.32	21.02	153.79
Hungary	31.22	47.92	14.32	6.04	6.02	9.27	245.98	360.77
Ireland	1.77	14.68	66.24	131.07	386.42	445.57	131.69	1,177.45
Italy	22.72	132.54	201.29	192.44	307.93	443.67	595.46	1,896.05
Lithuania[1]	200.79	162.47	27.78	7.76	7.33	7.27	37.66	451.05
Luxembourg	0.01	0.16	1.50	6.79	24.55	10.41	1.72	45.14
Latvia	78.25	59.63	14.55	5.25	4.95	6.13	24.65	193.41
Malta[1]	0.03	0.10	0.12	0.55	1.67	3.42	1.74	7.63
Netherlands	2.43	14.13	41.80	89.67	368.10	876.56	257.05	1,649.73
Poland[1]	784.77	1,045.01	571.31	174.88	79.74	42.98	152.67	2,851.36
Portugal	21.09	41.90	52.02	51.81	71.46	68.78	48.68	355.73
Romania[1]	1,357.79	185.30	27.81	10.41	9.01	10.16	29.17	1,629.65
Sweden	0.52	6.88	44.23	83.81	145.69	118.34	49.07	448.52
Slovenia	18.44	59.48	38.96	11.99	5.84	2.17	4.70	141.57
Slovakia	18.06	1.84	0.95	0.55	1.72	10.71	196.55	230.38
United Kingdom	2.33	7.83	25.50	54.61	225.55	792.55	1,226.49	2,334.84
EU-27	2,835.10	2,458.54	2,704.65	2,734.75	5,235.16	6,231.06	5,092.96	27,292.15

Table continues on the next page.

Number of dairy cows in 2007								
Austria	12.64	106.43	199.95	112.12	65.70	21.58	3.27	521.68
Belgium	0.81	5.38	22.31	55.67	157.07	229.37	53.10	523.70
Bulgaria	122.40	72.37	38.42	25.55	31.89	28.25	31.31	350.18
Cyprus	0.01	0.05	0.09	-	0.78	7.44	14.17	22.65
Czech Rep.	3.21	3.87	7.40	5.01	7.65	21.63	367.76	416.52
Germany	4.48	71.02	309.83	463.05	832.31	1,278.20	1,117.50	4,076.38
Denmark	0.22	1.20	3.41	7.56	25.47	97.60	409.97	545.42
Estonia	5.18	4.71	4.89	3.84	4.71	8.45	76.05	107.84
Spain	9.86	38.90	100.08	118.55	226.38	227.81	253.28	974.86
Finland	0.85	14.20	80.13	82.23	73.47	37.25	7.94	296.07
France	3.67	21.53	113.95	362.56	1,436.40	1,612.55	263.99	3,814.63
Greece	3.09	12.17	16.84	16.87	28.27	45.11	35.06	157.41
Hungary	6.87	25.83	15.60	7.04	12.57	8.15	189.36	265.43
Ireland	0.63	4.12	24.64	65.27	252.75	525.90	184.91	1,058.21
Italy	13.44	95.80	155.70	136.67	244.67	474.94	769.68	1,890.91
Lithuania	116.66	109.75	47.89	23.08	23.71	22.65	54.64	398.37
Luxembourg	0.13	0.40	1.18	4.23	15.82	15.24	3.05	40.04
Latvia	41.00	41.09	22.74	12.38	12.61	17.16	35.35	182.32
Malta	0.07	0.09	0.18	0.27	1.41	2.89	3.18	8.08
Netherlands	1.50	9.15	22.29	41.28	179.32	770.28	444.49	1,468.30
Poland	565.39	659.73	689.79	353.11	236.34	104.59	158.83	2,767.78
Portugal	6.05	14.47	29.46	36.05	58.67	68.96	59.00	272.66
Romania	1,165.39	261.67	52.66	24.88	20.56	25.96	35.58	1,586.69
Sweden	0.01	1.60	13.33	30.81	83.83	122.55	117.52	369.65
Slovenia	11.19	36.27	35.71	17.83	13.29	6.47	3.42	124.19
Slovakia	11.48	2.29	0.76	0.67	1.65	6.16	154.22	177.22
United Kingdom	7.88	16.70	20.08	23.18	94.23	458.65	1,332.77	1,953.49
EU-27	2,114.11	1,630.79	2,029.31	2,029.76	4,141.53	6,245.79	6,179.40	24,370.68
%change, 2007 vs. 2000	-0.03	-0.03	-0.02	-0.03	-0.02	0.00	0.02	-0.01

Notes: 1) Data refer to the year 2003

Source: Eurostat (FSS).

Table 2.32, showing the number of dairy cows in herds of each size class, illustrates this pattern. For the EU as a whole, the largest number of dairy cows were kept in herds of a size ranging from 50 to 99 dairy cows. Form 2000 (2003) to 2007, the number of cows in herds of 50 cows and upwards increased in absolute terms. The number of cows in herds of less than 30 dairy cows declined in the period 2000 (2003) until 2007 by about 25%, with the percentage decline being rather equally distributed over the size classes.

Another observation from comparing numbers in Tables 2.31 and 2.32 is that whereas in the period 2000 (2003)-2007 the total number of farms having dairy cows declined by nearly 26%, the total number of dairy cows also declined, but much less steeply (only by 11%). This is a feature of the trend towards farm scale increases. However, it also shows implicit influence of milk quotas, which have kept the total volume of milk output more or less constant: the reduction in the total number of dairy cows roughly compensates the increase in milk yields (see Table 2.4 for aggregate milk yield trends), so that the total amount of milk produced remains stable. Without quotas in place, the yield increases are likely to have caused such a compensating reduction in cow numbers, and total output would probably have increased.

Table 2.33 provides additional information on the number of specialist dairy farms in the total number of farms having dairy cows. As can be seen from comparing farm numbers and cow numbers, Member States having a large number of farms (e.g. Romania) did not necessarily have a high share in the number of dairy cows they represent. Obviously not only farm numbers, but also farm size is important in explaining the shares in total dairy cow numbers.

In 2007, specialist dairy farms had a predominant share (more than 50%) of farms with dairy herds in 13 of the Member States of EU-15. In the EU-10, specialist dairy farms predominated in five Member States (Cyprus, Latvia, Malta, Portugal and Slovakia). In the remaining Member States, non-specialist holdings with dairy cows were in the majority. There is no general pattern in the trends over time at Member State level. In those Member States where specialist dairy farms are claiming a greater share of farms with dairy herds, the percentage of dairy cows on specialist dairy farms has also increased. However, the opposite is not always the case. For example, the UK ended with a lower share of specialist dairy farms in all farms with dairy herds, yet the proportion of dairy cows on specialist dairy farms continued to increase.

Table 2.33 Farms with dairy cows and specialist dairy farms, by Member State, 2007

	Farms with dairy cows		Dairy cows		TF 41 dairy farms	
	in 1000	in %	in 1000	in %	in 1000	in %
Austria	49.45	2.0	521.68	2.1	31.73	4.8
Belgium	13.32	0.5	523.70	2.1	6.57	1.0
Bulgaria	120.82	4.9	350.18	1.4	42.57	6.5
Cyprus	0.24	0.0	22.65	0.1	0.20	0.0
Czech Republic	5.62	0.2	416.52	1.7	1.77	0.3
Germany	101.07	4.1	4,076.38	16.7	74.26	11.3
Denmark	5.38	0.2	545.42	2.2	4.46	0.7
Estonia	6.08	0.2	107.84	0.4	2.33	0.4
Spain	37.29	1.5	974.86	4.0	26.64	4.1
Finland	14.39	0.6	296.07	1.2	12.25	1.9
France	93.12	3.7	3,814.63	15.7	55.04	8.4
Greece	8.02	0.3	157.41	0.6	2.62	0.4
Hungary	12.17	0.5	265.43	1.1	5.91	0.9
Ireland	21.32	0.9	1,058.21	4.3	19.30	2.9
Italy	62.79	2.5	1,890.91	7.8	26.07	4.0
Lithuania	123.17	5.0	398.37	1.6	32.33	4.9
Luxembourg	1.09	0.0	40.04	0.2	0.64	0.1
Latvia	43.69	1.8	182.32	0.7	22.08	3.4
Malta	0.19	0.0	8.08	0.0	0.10	0.0
Netherlands	24.51	1.0	1,468.30	6.0	18.90	2.9
Poland	651.05	26.2	2,767.78	11.4	105.26	16.0
Portugal	13.50	0.5	272.66	1.1	9.59	1.5
Romania	1,012.41	40.7	1,586.69	6.5	117.57	17.9
Sweden	7.10	0.3	369.65	1.5	6.49	1.0
Slovenia	19.20	0.8	124.19	0.5	7.39	1.1
Slovakia	11.54	0.5	177.22	0.7	6.74	1.0
United Kingdom	28.14	1.1	1,953.49	8.0	17.83	2.7
EU-27	2,486.67	100.0	24,370.68	100.0	656.64	100.0

Source: Eurostat (FSS).

The shares of dairy cows in the total number of dairy cows that are kept on specialist farms are in general higher than the corresponding shares in terms of holdings (Table 2.34). This reveals that the scale of specialist dairy farms tends to be larger than that of non-specialist dairy farms. In 2007, in 7 out of the EU-15 Member States (notably Denmark, Finland, Ireland, the Netherlands, Portugal, Sweden and the UK) more than 90% of the total number of dairy cows was in specialist dairy herds. In the EU-10, this was the case only for Cyprus. In new Member States such as Romania, the Czech Republic, Slovakia, Lithuania, and Poland, where more than 50% of total dairy cows is kept on non-specialist dairy farms, these farms are still important for understanding changes in milk supply.

Table 2.34 % TF 41 farms and cows kept at TF 41 as % of all cows, 2000-2007

	2000	2003	2005	2007	2000	2003	2005	2007
Austria	61.6	58.2	68.0	64.2	69.3	75.0	83.5	81.3
Belgium	48.5	51.4	48.7	49.3	61.3	63.2	61.0	62.7
Denmark	77.6	80.3	82.1	82.9	84.7	88.5	92.8	92.7
Finland	89.8	87.6	88.1	85.1	94.1	92.9	93.6	92.1
France		59.5	58.6	59.1		62.9	61.3	61.6
Germany	60.3	70.7	70.6	73.5	61.8	71.5	71.4	75.4
Greece	16.9	26.8	29.0	32.7	44.9	59.6	69.1	71.5
Ireland	82.6	86.5	88.8	90.5	90.7	92.1	93.5	95.1
Italy	66.9	71.7	53.8	41.5	85.3	86.5	74.5	59.9
Luxembourg	74.0	71.2	71.1	58.7	77.0	75.0	74.8	71.7
Netherlands	76.3	87.6	87.4	77.1	89.8	93.6	93.4	91.5
Spain	60.3	70.0	72.8	71.4	80.2	87.3	89.6	88.1
Sweden	92.0	94.8	91.7	91.4	93.6	94.9	92.0	91.9
United Kingdom	78.9	81.0	80.9	63.4	84.6	88.1	88.8	90.8
Cyprus		88.0	83.3	83.3		93.1	94.9	94.2
Czech Republic		23.8	27.1	31.5		12.7	15.4	17.5
Estonia		32.1	25.5	38.3		71.9	67.0	75.8
Hungary	29.5	31.5	43.1	48.6	36.4	40.8	45.9	47.0
Latvia	8.4	12.5	26.1	50.5	18.9	30.3	48.8	66.1
Lithuania		14.1	17.0	26.2		19.8	27.7	38.0
Malta		70.6	61.1	52.6		83.2	84.0	83.0
Poland		14.0	11.9	16.2		20.5	25.8	39.5
Portugal	43.0	52.0	65.1	71.0	80.8	88.3	94.0	94.8
Slovakia	51.7	29.5	47.8	58.4	16.5	15.4	23.2	32.9
Slovenia	45.3	53.3	50.8	38.5	63.1	74.5	75.1	64.7
Bulgaria		24.7	33.7	35.2		33.3	47.9	54.3
Romania		4.0	13.7	11.6		6.1	19.6	18.8
EU	56.4	21.4	25.4	26.4	74.7	63.3	64.3	66.1

Source: Eurostat (FSS).

Table 2.35 shows the evolution of average herd sizes from 2000 to 2007, and indicates that even if herd size may be growing in some countries on both the specialist and non-specialist dairy farms, overall the share of production is shifting towards the specialist units (farm type TF 41).

Table 2.35 Evolution of herd sizes and their output by Member State, 2000 and 2007

Member State	Herd size (number of cows/farm)				Share of total milk production			
	Specialist		Non-specialist		Specialist		Non-specialist	
	2000	2007	2000	2007	2000	2007	2000	2007
Belgium	49	50	33	35	0.67	0.72	0.33	0.28
Denmark	64	119	45	68	0.92	0.95	0.08	0.05
Germany	42	50	35	41	0.79	0.85	0.21	0.15
Greece	24		7		0.71		0.29	
Spain	26	31	14	4	0.90	0.93	0.10	0.07
France	38	46	36	41	0.69	0.74	0.31	0.26
Ireland	43	55	23	20	0.90	0.97	0.10	0.03
Italy	33	48	14	16	0.92	0.93	0.08	0.07
Luxembourg	39	43	35	37	0.75	0.79	0.25	0.21
Netherlands	59	72	31	62	0.96	0.96	0.04	0.04
Austria	17	19	11	11	0.51	0.61	0.49	0.39
Portugal	23	29	3	10	0.95	0.99	0.05	0.01
Finland	19	24	12	14	0.98	0.98	0.02	0.02
Sweden	38	53	19	32	0.95	0.93	0.05	0.07
United Kingdom	90	118	55	81	0.93	0.95	0.07	0.05
EU-15 average	41	51	25	25	0.83	0.87	0.17	0.13
	2004	2007	2004	2007	2004	2007	2004	2007
Cyprus								
Czech Republic	68	93	154	158	0.24	0.28	0.76	0.72
Estonia	40	63	32	17	0.75	0.86	0.25	0.14
Hungary	27	54	24	37	0.50	0.45	0.50	0.55
Lithuania	12	14	8	8	0.41	0.56	0.59	0.44
Latvia	18	14	7	8	0.69	0.71	0.31	0.29
Malta	-	63				0.99		0.01
Poland	16	16	7	6	0.60	0.63	0.40	0.37
Slovakia	148	190	248	199	0.24	0.19	0.76	0.81
Slovenia	12	15	8	8	0.89	0.80	0.11	0.20
EU-10 average	18	18	8	8	0.54	0.56	0.46	0.44
Bulgaria		10		8		0.76		0.24
Romania		4		2		0.72		0.28
EU-02 average		5		3		0.76		0.24
EU-27 average		31		10		0.83		0.17

Source: EU-FADN.

2.3.2 Dairy herds in Less-Favoured Areas

Table 2.36 shows the distribution of dairy cows in Less Favoured Areas (LFAs) and in non-LFAs by Member State. The distribution of total holdings and specialist dairy holdings in the two area types per Member State is given in Table 2.37.

The evolution of all farm holdings and specialist dairy holdings in both types of LFA regions (non-mountainous and mountainous) and in non-LFA areas is remarkably similar. Generally, specialist dairy farms retained a higher share than average in all areas, with country-specific exceptions (for example, Sweden). Because it is a comparison between 2000 and 2007, this table does not report the distribution of all holdings and specialist livestock grazing holdings as of 2007, which is given in Table 2.35. Effectively, the EU-12 countries were not members of the EU in 2000, and therefore their territory was not zoned according to LFA criteria. Nevertheless, the farms that were in non-LFA zones in 2007 were also in the same non-LFA zones in 2000, so this comparison between 2000 and 2007 remains valid.

Table 2.36 Distribution of dairy cows by LFA/non-LFA, 2003 and 2007

	2003				2007			
	Total	LFA - non-mountain-ous areas	LFA - mountain-ous areas	Non LFA	Total	LFA - non-mountain-ous areas	LFA - mountain-ous areas	Non LFA
	in 1000	share			in 1000	share		
Austria	580.52	0.14	0.66	0.12	521.68	0.14	0.66	0.20
Belgium	585.40	0.19		0.81	523.70	0.19		0.81
Bulgaria	375.58			1.00	350.18	0.09	0.28	0.63
Cyprus	25.96			1.00	22.65			1.00
Czech Republic	467.85			1.00	416.52	0.43	0.18	0.39
Denmark	596.03			1.00	545.42			1.00
Estonia	119.80			1.00	107.84	0.33		0.67
Finland	333.87	0.25	0.75		296.07	0.24	0.76	
France	4,050.96	0.18	0.18	0.64	3,814.63	0.18	0.17	0.65
Germany	4,380.83	0.58	0.04	0.38	4,076.38	0.58	0.04	0.38
Greece	170.19	0.49	0.19	0.32	157.41	0.47	0.18	0.35
Hungary	294.97			1.00	265.43	0.53		0.47
Ireland	1,160.45	0.54		0.46	1,058.21	0.54		0.46
Italy	1,857.00	0.08	0.27	0.65	1,890.91	0.10	0.28	0.62
Latvia	182.48			1.00	182.32			1.00
Lithuania	451.05			1.00	398.37	0.43		0.57
Luxembourg	40.60	1.00			40.04	1.00		
Malta	7.63			1.00	8.08	1.00		
Netherlands	1,477.77			1.00	1,468.30			1.00
Poland	2,851.36			1.00	2,767.78	0.58	0.02	0.40
Portugal	335.28	0.36	0.16	0.48	272.66	0.38	0.13	0.49
Romania	1,629.65			1.00	1,586.69	0.09	0.26	0.65
Slovakia	208.20			1.00	177.22	0.32	0.46	0.22
Slovenia	131.10			1.00	124.19	0.19	0.50	0.31
Spain	1,096.41	0.37	0.32	0.31	974.86	0.38	0.33	0.29
Sweden	402.52	0.49	0.15	0.36	369.65	0.48	0.15	0.37
United Kingdom	2,191.94	0.28		0.72	1,953.49	0.30		0.70

Source: EU-FADN.

Table 2.37 Distribution of farms with dairy cows by LFA/non-LFA, 2003 and 2007

	2003				2007			
	Total	LFA - non-mountain-ous areas	LFA - mountain-ous areas	Non LFA	Total	LFA - non-mountain-ous areas	LFA - mountain-ous areas	Non LFA
	in 1000	share			in 1000	share		
Austria	65.13	0.12	0.72	0.16	49.45	0.12	0.72	0.16
Belgium	16.57	0.17		0.83	13.32	0.17		0.83
Bulgaria	195.01			1.00	120.82	0.10	0.42	0.58
Cyprus	0.25			1.00	0.24			1.00
Czech Republic	8.45			1.00	5.62	0.44	0.25	0.31
Denmark	7.95			1.00	5.38			1.00
Estonia	12.40			1.00	6.08	0.51		0.49
Finland	19.40	0.26	0.74		14.39	0.24	0.76	
France	113.93	0.18	0.21	0.61	93.12	0.17	0.22	0.61
Germany	121.82	0.59	0.08	0.33	101.07	0.60	0.07	0.33
Greece	11.55	0.45	0.26	0.29	8.02	0.45	0.24	0.31
Hungary	22.00			1.00	12.17	0.39		0.61
Ireland	28.09	0.63		0.37	21.32	0.61		0.39
Italy	67.50	0.08	0.54	0.38	62.79	0.10	0.54	0.36
Latvia	63.65			1.00	43.69			1.00
Lithuania	193.39			1.00	123.17	0.48		0.52
Luxembourg	1.04	1.00			1.09	1.00		
Malta	0.17			1.00	0.19	1.00		
Netherlands	25.00			1.00	24.51			1.00
Poland	873.80			1.00	651.05	0.50	0.05	0.45
Portugal	27.05	0.22	0.44	0.34	13.50	0.28	0.39	0.33
Romania	1,204.89			1.00	1,012.41	0.08	0.25	0.67
Slovakia	14.23			1.00	11.54	0.22	0.70	0.08
Slovenia	17.19			1.00	19.20	0.20	0.58	0.22
Spain	51.03	0.36	0.38	0.26	37.29	0.39	0.38	0.23
Sweden	9.72	0.51	0.19	0.30	7.10	0.50	0.18	0.32
United Kingdom	28.21	0.34		0.66	28.14	0.35		0.65

Source: EU-FADN.

2.4 Policy related data for the dairy sector

2.4.1 Milk quota system

A key policy instrument with regard to the dairy sector is the milk quota system. National reference quantities (quotas) are specified on an annual basis for each Member State, with the quota based on a "historic" milk production reference, taking into account statistical and delivery records. When an overrun of the national reference quantities is recorded, a Member State is liable to pay a levy (the 'super-levy'). Individual quantities are allocated to each producer. The quota is divided into a delivery part and a direct sales part, which are managed separately. Most of producers have only delivery quota rights. Those producers who have been allocated both quota rights (e.g. deliveries and direct sales) can request to shift a quantity of milk under the one type reference quantity to the other either temporarily (for one specific quota year) or permanently. To each individual producer a reference fat content is assigned, which is applied to the individual reference quantities. Any difference between the real fat content and the reference fat content leads, at the end of the quota year, to an adjustment in each individual delivery (fat correction). The quota year spans a 12 month period which runs from 1 April to 31 March. If the sum of deliveries adjusted is higher than the deliveries actually made (a positive fat correction), the levy is calculated on the basis of adjusted total deliveries. The levy is currently set at €27.83 per 100kg of milk (see Regulation (EC) 1234/2007, Article 78). Producers are liable with regard to the Member State for payment of their contribution to the levy for the mere fact of having overrun their available reference quantities. Each producer's contribution to the payment of a levy is established by a decision of the Member State, after any unused part of the national reference quantity has, or has not been reallocated in proportion to the individual producer or according to objective criteria. The purchasers of milk, which should be registered and approved as such by the Member State in which territory the purchaser operates, has to draw up a statement for each producer delivering milk to him and forward their declarations to the competent authority before 15 May each year. The Member States have the responsibility to audit purchasers' management of quotas, with every purchaser being checked at least once in five years. Each year before 1 September the Member State must notify the Commission on the results of the application of the milk quota over the previous period.

Milk quotas are linked to the producer's holding, and can be transferred from one farm to another by sale, lease or inheritance. For purposes of restructuring, Member States may authorize quota transfers without a corresponding transfer of land. Moreover, Member States may authorize temporary leasing of quotas within a 12 month period. Member States have set up a national reserve quota within their national quota ceilings. Member States build up their national reserves by various means, including (i) purchase from producers, (ii) confiscation of quota from a producer with zero production in any one year, or where only 85% or less is used (this was 70% up to 1 April 2009), (iii) retention of a part of quota that is being transferred through a lease or sale (the so-called 'siphon'). Member States have adopted rules that allow for allocation to producers of all or part of the quantities of the national reserve.

The regulations give a degree of discretion to Member States regarding their implementation and administration of the quota scheme, according to country-specific conditions. This flexibility concerns inter alia the way in which a Member State decides to reallocate any unused part of the national reference quantity to individual producers, and the objective criteria they use for this, and the rules established for quota transfers between farmers. In particular, quota reallocation between producers maybe more market driven (involving tradable quota, with or without zoning restrictions and siphon-conditions) or determined by administrative procedures (see also Réquillart et al., 2008, p. 32).

For the period under consideration quotas were increased under the Agenda 2000 agreement, the 2003 Luxemburg reform only for specific Member States and in 2008/09 as a result of the 'CAP Health Check' in 2008. According to the Health Check reform, quotas are increased by 1% a year from 2009/10 to 2013/14. For Italy, the stepwise quota increases (in total 5%) were implemented as a one off increase in 2009/10.

Table 2.38 shows milk quota quantities (deliveries plus direct sales) in the EU Member States from 2000/01 until 2014/15, after which the quota system is scheduled to expire, while Table 2.39 shows the milk production in excess or deficit of the allocated milk quota per Member State.

Figure 2.7 shows the over-run and under-use of the milk quota reference quantities, aggregated over Member States. Whereas the aggregate over-run at EU level has fluctuated between 0.3 and 1.2 million tonnes, the aggregate under-use has displayed a gradual increase, to an amount close to 6 million tonnes. The net effect at EU level (see net over-run) becomes negative after 2003/04 and decreased over time to a net under-use of about 5.3 million tonnes in 2008/09 (equivalent with 3.7 % of the total EU-27 reference quota). The net underuse in 2009/10 was even higher and slightly exceeded the 10 million tonnes (equivalent to 7% of the total EU-27 reference quota).

Table 2.38 Evolution of milk quotas in EU MS, 2000/1 – 2014/15, 1000 t

	2000/1	2001/4	2004/6	2006/7	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	2013/15
Austria	2,749	2,749	2,750	2,764	2,778	2,847	2,876	2,905	2,934	2,963	2,993
Belgium	3,310	3,310	3,310	3,241	3,344	3,427	3,462	3,496	3,531	3,566	3,602
Bulgaria					979	999	1,009	1,018	1,028	1,039	1,049
Cyprus			145	145	145	148	149	151	153	154	156
Czech Rep.			2,682	2,738	2,738	2,793	2,821	2,849	2,877	2,906	2,935
Denmark	4,455	4,455	4,455	4,478	4,500	4,613	4,659	4,705	4,752	4,800	4,848
Estonia			624	646	646	659	666	673	679	6,869	693
Finland	2,406	2,406	2,407	2,419	2,431	2,492	2,517	2,542	2,567	2,593	2,619
France	24,236	24,236	24,236	24,537	24,478	25,091	25,342	25,582	25,582	26,110	26,371
Germany	27,865	27,865	27,865	27,864	28,142	28,847	29,136	29,427	29,722	30,019	30,319
Greece	675	701	821	821	821	837	845	854	862	871	880
Hungary			1,947	1,990	1,990	2,030	2,050	2,071	2,091	2,112	2,133
Irelands	5,342	5,396	5,396	5,396	5,396	5,504	5,559	5,670	5,670	5,727	5,784
Italy	10,314	10,530	10,530	10,530	10,530	10,741	11,289	11,289	11,289	11,289	11,289
Latvia			695	728	729	743	751	758	766	773	781
Lithuania			1,646	1,704	1,705	1,739	1,756	1,774	1,792	1,809	1,828
Luxembourg	269	269	269	270	272	279	281	284	287	290	293
Malta			49	49	49	50	51	51	52	52	52
Netherlands	11,075	11,075	11,075	11,130	11,185	11,466	11,580	11,696	11,813	11,931	12,050
Poland			8,964	9,380	9,380	9,568	9,663	9,706	9,858	9,956	10,056
Portugal	1,872	1,870	1,870	1,930	3,057	31,148	3,149	3,181	3,213	3,245	3,277
Romania					1,939	1,987	2,007	2,027	2,048	2,068	2,089
Slovakia			1,013	1,040	1,041	1,062	1,072	1,083	1,094	1,105	1,116
Slovenia			560	576	576	588	594	600	606	612	618
Spain	5,917	6,117	6,117	6,117	6,117	6,239	6,302	6,365	6,428	6,493	6,558
Sweden	3,303	3,303	3,303	3,320	3,336	3,420	3,454	3,488	3,523	3,558	3,594
UK	14,603	14,610	14,610	14,683	14,756	15,125	15,276	15,429	15,583	15,739	15,897
EU-15	118,389	118,893									
EU-25			137,338	138,496							
EU-27					143,060	146,412	148,316	149,686	150,800	152,467	153,880

Source: Regulations (EC) 1255/1999, 1234/2007 and 72/2009.

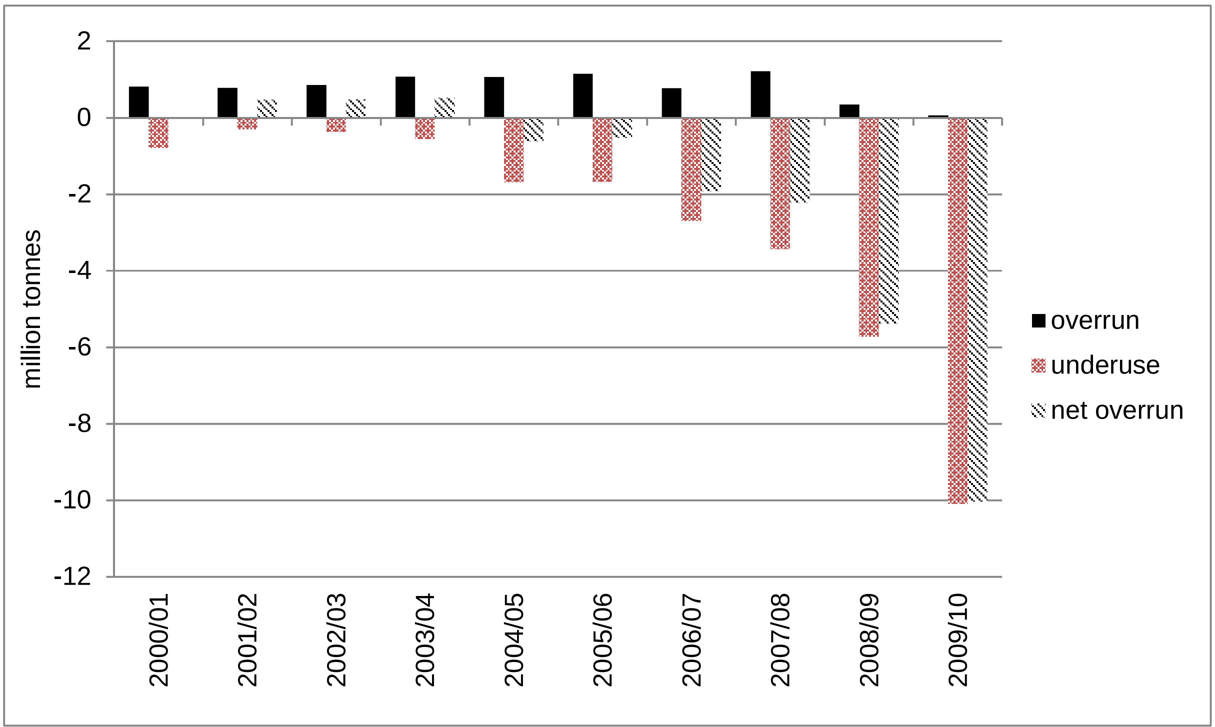
Table 2.39 Milk production in excess or deficit of the allocated quota per Member State (in %)

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Austria	-3.5	3.7	3.8	3.4	1.4	2.8	3.3	3.2	1.2	-1.5
Belgium	-0.5	0.2	0.9	0.4	0.7	-0.1	-1.2	-0.1	-1.7	-3.7
Denmark	0.4	0.1	0.5	0.8	0.1	-0.1	0.6	0.0	-0.3	0.4
Finland	1.1	2.9	1.4	-0.1	-2.0	-1.6	-3.0	-6.3	-9.4	-10.5
France	-0.7	-0.1	0.1	-1.5	-1.1	-1.4	-2.6	-1.4	-4.8	-8.6
Germany	0.9	0.5	-0.3	1.3	1.5	0.7	0.0	1.3	-0.9	-2.1
Greece	2.3	-0.2	-3.5	-1.5	-11.9	-5.3	-5.4	-8.0	-11.8	-17.5
Ireland	-0.3	0.2	-0.2	0.5	0.8	-1.8	-0.3	0.7	-2.5	-10.3
Italy	3.9	3.7	6.0	4.5	4.0	6.0	6.0	5.6	1.5	-3.7
Luxembourg	0.4	1.3	1.6	0.7	0.9	1.1	0.3	0.7	0.6	-0.9
Netherlands	-0.8	0.5	-0.3	0.5	0.6	-0.1	0.3	1.3	1.4	0.4
Portugal	-0.4	-3.1	0.5	-2.6	-0.8	0.0	-2.8	-2.5	-4.0	-7.7
Spain	-3.5	-2.4	-0.5	-0.8	1.1	0.2	-1.5	-2.2	-4.2	-6.1
Sweden	-0.4	-0.2	-3.0	-2.5	-2.9	-4.5	-6.0	-11.5	-12.3	-17.7
UK	-2.0	-0.5	-0.8	0.2	-1.1	-1.9	-3.3	-5.3	-9.7	-12.1
Cyprus					-8.4	1.8	0.4	3.9	1.0	0.3
Czech Rep.					-8.6	0.6	-2.0	-1.4	-3.1	-12.3
Estonia					-7.0	-5.8	-6.3	-6.5	-7.6	-12.7
Hungary					-18.3	-12.3	-17.3	-10.8	-16.0	-22.5
Latvia					-27.3	-16.3	-11.1	-7.8	-8.6	-15.1
Lithuania					-15.0	-17.8	-14.7	-14.9	-15.8	-24.7
Malta					-14.0	-15.4	-15.3	-17.7	-20.7	-19.7
Poland						3.4		-3.6	-0.9	-4.4
Slovakia					-12.6	-2.4	-6.2	-6.1	-10.4	-20.7
Slovenia						-2.2		-5.0	-8.4	-10.4
Bulgaria								-14.9	-12.5	-14.0
Romania								-30.3	-26.0	-37.5

Notes: Positive (negative) values denote milk production in excess (deficit) of the allocated milk quota. Direct sales quota is excluded.

Source: Productschap Zuivel (various years).

Figure 2.7 Overrun and underuse of milk quota in the EU



Source: DG AGRI (various years).

2.4.2 Market support: 'safety net' intervention

Since the 2003 reform and as in other sectors, the elements of dairy market support are increasingly oriented towards a 'safety net' approach, with public intervention (buying into storage) being a measure of last resort. The prevailing rules on intervention are laid down in Chapter 1 of Regulation (EC) 1234/2007. Only butter and skim milk powder are eligible for public intervention. Intervention is accessible from March 1st to August 31st of any year. As a result of the 2003 reform, butter and SMP intervention prices were reduced step by step over a four year period, beginning on 1 July 2004 (Table 2.40). The cumulative percentage declines in the butter and SMP intervention prices were 25% and 15%, respectively. The intervention prices did not change with the Single CMO Regulation (Regulation (EC) 1234/2007). Most recently, the SMP intervention price was further reduced by another 3% within the so-called mini milk package (Regulation (EC) 361/2008).

Table 2.40 Intervention prices (and percentage declines) for butter and SMP, €/100kg

Product\year	2003/04	2004/04	2005/06	2006/07	2007/08	2008/09 and onwards
Butter	328.20	305.23	282.44	259.52	246.39	246.39
		(-7%)	(-7%)	(-7%)	(-4%)	(0%)
SMP	205.52	195.24	184.97	174.69	174.69	169.80
		(-5%)	(-5%)	(-5%)	(0%)	(-3%)

Source: Regulations (EC) 1787/2003, 1234/2007 and 361/2008.

Buying in takes place at a guaranteed price (at 90% of intervention price for butter and for SMP at the intervention price) for the quantities offered for intervention until the thresholds given in Table 2.41 below. The Commission may continue buying in additional quantities using a tendering procedure and without a guaranteed price.

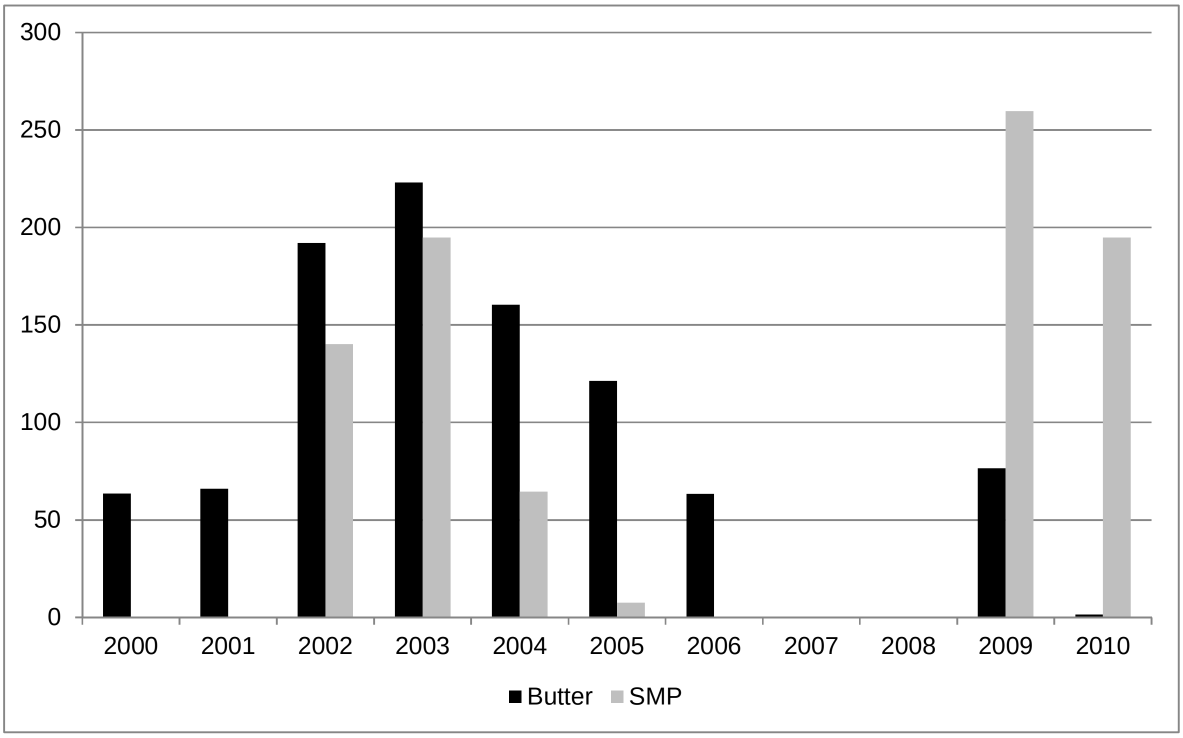
Table 2.41 Threshold levels for butter and SMP intervention, 1000 t

Product\year	2004	2005	2006	2007	2008 and onwards
Butter	70	60	50	40	30
SMP	109	109	109	109	109

Source: Regulation (EC) 1787/2003.

Figure 2.8 shows the end-of-year public intervention stocks for butter and skim milk powder over the last decade. In 2009, the sharp decline in commodity prices resulted in the adoption of 'emergency measures' that included keeping intervention open between 1 September and 28 February 2010, and potentially over the winter of 2010/11, depending on how the market situation develops.[5]

Figure 2.8 Public intervention stocks for butter and skim milk powder (SMP) on 31 December, 2000-2010, 1000 t



Source: DG AGRI (various years).

With regard to skim milk powder, the largest quantity moved into intervention storage over the last decade was purchased in 2009. Germany and France in particular applied this instrument in 2009 and 2010. For butter, the largest quantity was purchased in 2003. Besides Germany and France, butter has been purchased quite heavily in Ireland, Spain, the Netherlands, Portugal and the United Kingdom.

2.4.3 Direct aid

By way of compensation for the cuts in intervention prices, from 2004 to 2007 producers qualify for support payments paid directly to producers. These payments, which will be paid per holding and calendar year, consist initially of two elements: the dairy premiums, paid equally to all milk producers and additional payments paid to milk producers according to criteria decided upon by the Member States. Following Regulation (EC) 1782/2003 (Art. 95) milk producers were granted a dairy premium that will be paid on the individual reference quantity for milk on 31st of March on the holding of the corresponding calendar year. It amounted to:

- €8.15/tonne for the calendar year 2004,

[5] In practice, intervention buying-in stopped for butter in early September 2009 and in early October 2009 for SMP. Tenders for intervention during the period December 2009 and February 2010 were not opened due to the improved market situation.

- €16.31/tonne for the calendar year 2005,
- €24.49/tonne for the calendar years 2006 and 2007.

Beyond the dairy premium, Member States were allowed to make additional payments to producers on a yearly basis. A Member State may retain at most up to 10% of the component of a national contributed by a certain sector (i.e. the dairy sector). The additional payments for milk producers are listed in Table 2.42.

Table 2.42 Additional payments for milk producers, million euro

	National upper limit				Expenditure			
	2004	2005	2006	2007	2004	2005	2006	2007
Austria	10.1	20.2	30.3	30.3	10.1	19.5	29.0	0.0
Belgium	12.1	24.3	36.5	36.5	12.1	23.4	0.0	0.0
Demark	13.3	32.7	49.1	49.1	16.3	0.0	0.0	0.0
Finland	8.8	17.7	26.5	26.5	8.8	17.1	0.0	0.0
France	88.7	177.9	266.8	266.8	88.7	171.6	0.0	0.0
Germany	102.0	204.5	306.8	306.8	101.0	0.0	0.0	0.0
Greece	2.3	4.6	6.9	6.9	2.3	4.5	6.6	0.0
Ireland	19.2	38.5	57.8	57.8	19.0	0.0	0.0	0.0
Italy	36.3	72.9	109.5	109.5	36.3	69.7	0.0	0.0
Luxembourg	1.0	2.0	3.0	3.0	1.0	0.0	0.0	0.0
Netherlands	40.5	81.3	121.9	121.9	40.5	78.4	117.1	0.0
Portugal	6.9	13.7	20.6	20.6	6.3	13.5	20.0	0.0
Spain	20.4	40.9	61.3	61.3	20.1	38.4	0.0	0.0
Sweden	12.1	24.2	36.4	36.4	12.2	15.7	23.5	0.0
United Kingdom	53.4	107.1	160.6	160.6	51.2	0.0	0.0	0.0

Source: Regulation (EC) 1782/2003, Article 96 and DG AGRI (unpublished).

Since 2007 for all Member States dairy premiums and additional payments have been included into the Single Farm Payment. However, as a result of the 'CAP Health Check' in 2008, Member States can give additional support to dairy farmers up to 31 March 2014. A sum of €300 million has been devoted to help dairy farmers who suffer from the sharp decline in milk prices in 2009. This sum was allocated to Member States according to 2008/09 quota quantity.

Another form of direct aid payments are complementary national direct payments (CNDP) allocated to certain accession countries since 2005 (Table 2.43). Part of this aid (percentage varying from 9 to 39 per cent of total CNDP expenditure) is coupled to dairy production. In the EU-10 Hungary is the Member State with the highest CNDP expenditure. According to the EU-FADN data, also Malta applies national aids. The equivalent amounts per tonne of milk vary between €10/tonne and €20/tonne (an exception being Malta which had higher amount) (see EU-FADN). In the EU-15 only Finland applied national aids to the dairy sector, with a support rate of approximately €80/tonnes of milk (see EU-FADN). The Finish national aids follows from schemes applied under Articles 141 and 142 of the Act of Accession.

The various state aids are registered with the European Commission and are recapitulated in Table 2.44.

Table 2.43 CNDP payments, 2005-2008, € and %

	2005					2006				
	Total CNDP	Envelope for Dairy	% dairy of total	Payments for Dairy	% of dairy envelope paid	Total CNDP	Envelope for Dairy	% dairy of total	Payments for Dairy	% of dairy envelope paid
Bulgaria										
Cyprus						26,224	3,502	13.35	3,414	97.49
Czech Rep.										
Estonia						46,506	17,824	38.33	10,067	56.48
Hungary	430,354	37,836	8.79	36,364	96.11	454,428	61,009	13.43	53,463	87.63
Latvia	61,271	11,484	18.74	6,944	60.47	69,260	20,051	28.95	14,685	73.24
Lithuania	124,161	22,892	18.44	14,710	64.26	159,447	43,725	27.42	16,176	36.99
Malta										
Poland										
Romania										
Slovakia										
Slovenia				7,077					11,344	

	2007					2008				
	Total CNDP	Envelope for Dairy	% dairy of total	Payments for Dairy	% of dairy envelope paid	Total CNDP	Envelope for Dairy	% dairy of total	Payments for Dairy	% of dairy envelope paid
Bulgaria						169,108	15,622	9.24	13,145	84.14
Cyprus	34,462	3,492	10.13	3,364	96.33	32,403	3,474	10.72	3,252	93.61
Czech Rep.										
Estonia	48,198	18,845	39.10	16,170	85.81	48,987	17,880	36.50	17,691	98.94
Hungary	403,011	65,552	16.27	62,050	94.66	518,800	63,873	12.31	63,194	98.94
Latvia	71,402	21,394	29.96	19,839	92.73	72,944	20,368	27.92	19,706	96.75
Lithuania	180,967	46,295	25.58	20,244	43.73	188,558	42,302	22.43	34,658	81.93
Malta										
Poland										
Romania										
Slovakia										
Slovenia										

Source: EU-FADN.

Table 2.44 State aid to the dairy sector

Country	Sector	Scheme	Duration
Belgium	Raising of dairy cattle, Raising of poultry	N 704 / 2002 - Cessation of livestock activities in the poultry and the cattle sector	09.10.2002 - 30.06.2003
Belgium	Raising of dairy cattle	N 244 / 2004 – Project fixing mandatory payments for the health and quality of animals and products (dairy)	02.06.2004 - 01.05.2005
Bulgaria	Agriculture, forestry and fishing	XA 169 / 2009 - Aid for establishment and maintenance of herd books and for determination of genetic quality and yield of livestock	08.06.2009 - 31.12.2013
Bulgaria	Crop and animal production, hunting and related service activities	N 90 / 2010 - Investment aid to agricultural holdings to meet the quality requirements on the production and storage of raw milk laid down in Regulation (EC) 853/2004	09.03.2010 - 31.12.2011
Bulgaria	Crop and animal production, hunting and related service activities Manufacture of food products	N 108 / 2010 - State aid under the Temporary Framework to agricultural holdings active in primary production, processing and marketing of agricultural products	19.04.2010 - 31.12.2010
Cyprus		XA 118 / 2006 - Scheme to provide state aid to the Cyprus Holstein - Friesian Breeders Association	22.12.2006 - 21.12.2011
Cyprus		XA 395 / 2007 - Aid à l'association chypriote d'exploitants de bovins Holstein-Friesian.	19.12.2007 -
Cyprus	Raising of dairy cattle Raising of poultry Raising of sheep and goats	XA 455 / 2008 - Programme for the eradication and monitoring of Brucellosis of cattle and ovines	30.12.2008 - 31.12.2009
Cyprus		XA 138 / 2009 - Program for the Monitoring of Transmissible Bovine Spongiform Encephalopathy	29.04.2009 - 31.12.2009
Cyprus		XA 274 / 2009 - Program of extirpation and monitoring of brucellosis in Cattle and Ovines.	13.01.2010 - 31.12.2010
Cyprus		XA 4 / 2010 - Programme for the monitoring of bovine spongiform Encephalopathy	15.01.2010 - 31.12.2010
Cyprus	Agriculture, forestry and fishing	XA 104 / 2010 - Aide à l'association chypriote d'exploitants de bovins Holstein-Friesian	01.01.2011 - 31.12.2013
Czech Rep.		N 427 / 2005 - National Eradication program on Infective Beef Rhinotracheitidis	01.01.2006 - 31.12.2012
Denmark	Animal production	N 341 / 2004 - Co-financing of expenses paid by slaughterhouses and processing plants in relation to the monitoring of TSE among bovine, ovine and caprine animals	02.08.2004 - 31.12.2004
Denmark		N 277 / 2005 - Financing of expenses paid by slaughterhouses and processing plants in relation to the monitoring of TSE among bovine, ovine and caprine animals	03.06.2005 - 31.12.2005
Denmark	Agriculture, forestry and fishing	N 597 / 2008 - Production and pro mille funds in agriculture	01.01.2010 - 31.12.2013
Estonia	Agriculture, forestry and fishing	XA 93 / 2008 - Support for the breeding of agricultural animals	16.02.2008 - 31.12.2011
Finland	Agriculture, forestry and fishing	N635/2003 Amendment of Finnvera loan program for the processing and marketing of agricultural products	13.05.2004
Hungary		XA 73 / 2007 - State aid for the prevention and eradication of certain animal diseases	04.05.2007
Lithuania	Crop and animal production, hunting and related service	N 683 / 2007 - Compensation of losses	22.07.2007 -

Country	Sector	Scheme	Duration
	activities Manufacture of food products	caused by transmissible animal diseases	31.12.2013
Slovakia		XA 255 / 2009 - State aid scheme for prevention and eradication of animal diseases as amended by appendix 1	27.11.2009 - 31.12.2013
Sweden	Raising of dairy cattle	N 164 / 2003 - Aid for TSE and BSE tests	15.04.2003 - 06.10.2003

Source: European Commission (2010c).

2.4.4 Private intervention storage

In order to balance the milk market and stabilise market prices, the Common Market Organisation has provided for the granting of aid for private storage with respect to cream, certain butter products and certain cheese products (see Regulation (EC) 1234/2007, Article 28). The Commission determines which national quality grades should be met before a product is eligible for the private storage scheme. The amount of aid is fixed by the Commission, taking into account storage costs and the likely trend of the market price. Tables 2.45 up to 2.47 provide further details of the aids applied and the volumes put into private storage.

Since the cheese market is steadily expanding, with increasing demand on domestic and international markets, the Commission decided that the private storage of high value, market driven products like cheese is no longer necessary. The permanent and optional aids for private storage of cheese were therefore abolished (see Regulation (EC) 72/2009).

Table 2.45 Economic details of private storage aid for butter, 2001-2007

	2001	2002	2003	2004	2005	2006	2007
Fixed costs (€/tonne)	24.00	24.00	24.00	24.00	17.92	17.64	15.83
Daily allowance (€/tonne/day)	0.35	0.35	0.35	0.35	0.33	0.31	0.30
Interest (%/year)	4.50	3.00	2.75	2.25	2.25	2.50	3.75

Source: DG AGRI (unpublished).

Table 2.46 Aided quantities of private storage for cheese, 2001-2007, tonnes

Cheese types	2001	2002	2003	2004	2005	2006	2007
Parmigiano-Reggiano	78,301	81,052	81,234	82,353	87,870	81,684	79,564
Grana Padano	104,126	111,380	114,110	61,354	119,021	107,520	102,026
Provolone	9,535	223	57	5,317	4,400	1,848	720
Pecorino-Romano	15,000	15,000	15,000	19,000	16,205	12,918	14,316
Kefalotyri/Kasseri	1,778	1,353	871	403	423	147	194
Other long-keeping cheeses	21,701	21,040	20,780	18,905	23,425	19,522	17,793
Total	230,441	230,048	232,052	187,332	251,344	223,639	214,612

Source: DG AGRI (unpublished).

Table 2.47 Private storage aid for different types of cheese

		Grana-Padano	Parmigiano-Regiano	Provolone	Emmental	Kefalotyri	Pecorino-Romano
2001	Fixed Costs (€/tonne)	75.00	75.00	75.00	75.00	75.00	75.00
	Daily Allowance (€/tonne/day)	0.35	0.35	0.35	0.35	0.35	0.35
	Interest (€/tonne/day)	0.64	0.89	0.52	0.50	0.58	0.52
2002	Fixed Costs (€/tonne)	35.00	35.00	35.00	35.00	35.00	35.00
	Daily Allowance (€/tonne/day)	0.35	0.35	0.35	0.35	0.35	0.35
	Interest (€/tonne/day)	0.48	0.69	0.39	0.36	0.51	0.46
2003	Fixed Costs (€/tonne)	20.00	20.00	20.00	20.00	20.00	20.00
	Daily Allowance (€/tonne/day)	0.25	0.25	0.25	0.25	0.25	0.25
	Interest (€/tonne/day)	0.40	0.58	0.32	0.28	0.47	0.38
2004	Fixed Costs (€/tonne)	10.00	10.00	10.00	10.00	10.00	10.00
	Daily Allowance (€/tonne/day)	0.25	0.25	0.25	0.25	0.25	0.25
	Interest (€/tonne/day)	0.32	0.52	0.26	0.23	0.39	0.28
2005	Fixed Costs (€/tonne)	7.50	7.50	7.50	7.50	7.50	7.50
	Daily Allowance (€/tonne/day)	0.20	0.20	0.20	0.20	0.20	0.20
	Interest (€/tonne/day)	0.30	0.40	0.25	0.23	0.39	0.28
2006	Fixed Costs (€/tonne)	0.00	0.00	0.00	0.00	0.00	0.00
	Daily Allowance (€/tonne/day)	0.10	0.10	0.10	0.10	0.10	0.10
	Interest (€/tonne/day)	0.38	0.46	0.30	0.28	0.49	0.35
2007[1]	Aid (€/tonne/day)	0.48	0.56	0.40	0.38	0.59	0.45

Notes: 1) In 2007 there was a single amount of aid (Regulation (EC) 587/2007).
Source: DG AGRI (unpublished).

2.4.5 Export refunds

The historical purpose of export refunds was to enable EU exports to compete on the generally lower-priced international market. As shown in Table 2.48, expenditure on refunds and subsidised volumes for butter was higher in the years 2003/4 to 2005/6 than in the late 1990s/early 2000s, and the average refund per tonne remained around €170-190 per tonne. For cheese, the figures show small fluctuations around a more or less constant level from the late 1990s to the mid-2000s. By contrast, the figures for SMP show much more volatility over the same period. From 2006 onwards, the picture changes. Subsidised volumes and/or the rate of refund paid were much lower for all the product categories shown in Table 2.48, and export refunds were almost not used at all in 2007/08. However, in January 2009 export refunds were reintroduced to help support EU market prices in the wake of the sharp decline in world prices. Nonetheless, the quantities subsidised and the refund rates were far lower than in the earlier part of the decade.

The largest quantities of cheese exported with refunds in 2009/2010 were traded from the Netherlands, Germany, France and Finland, whereas for skim milk powder in the same period, the largest quantities

Table 2.48 Total subsidised exports and average refund paid

Periods from July to June	Quantities in 1000 tonnes				Expenditure in million euro				Average Refund paid in €/100 kg				
	Butter	SMP	Cheese	Other dairy products	Butter	SMP	Cheese	Other dairy products	Butter	SMP	Cheese	Other dairy products	Weighted average
1995-1996	146	241	422	1157	256	141	438	728	175	58	104	63	
1996-1997	276	269	402	1141	552	170	271	732	200	63	68	64	
1997-1998	169	176	324	1117	311	116	176	756	184	66	54	68	
1998-1999	165	221	226	951	286	192	149	759	173	87	66	80	
1999-2000	194	417	305	1104	333	338	236	905	172	81	77	82	90
2000-2001	197	128	305	873	338	26	238	410	171	20	78	47	67
2001-2002	194	87	279	764	325	37	189	402	168	42	68	53	72
2002-2003	292	220	317	833	545	163	268	596	187	74	84	72	95
2003-2004	353	259	321	880	618	142	239	631	175	55	74	72	90
2004-2005	354	212	300	827	519	66	157	409	146	31	52	49	68
2005-2006	295	117	317	737	292	15	141	276	99	13	45	38	49
2006-2007	3	126	291	458	0	26	108	129	3	20	37	28	30
2007-2008	0	0	0	16	0	0	0	2	0	0	0	12	12
2008-2009	98	126	134	466	54	26	25	96	55	20	18	21	24
2009-2010	71	129	128	409	42	32	24	97	59	25	19	24	27

Source: DG AGRI (unpublished).

exported with a refund came from Belgium, France and Germany. However, it is important to note that these products circulate easily within the single market of the EU and EU exporters are free to choose the port of departure for their products. Therefore, the Member State from which products are exported is not always the Member State in which they were produced.

2.4.6 Aid for marketing dairy products

Aid measures for the marketing of dairy products within the CAP are: aid for skim milk and SMP used as animal feed or for casein production, and for butter intended for pastry and ice cream manufacture, or for direct consumption.[6]

Budget expenditure on aid for skim milk powder as an animal feedstuff was reduced significantly in the period after 2000, and was zero in 2010. As laid down in Regulation (EC) 72/2009 aid for skim milk and SMP for use as feeding stuffs has become an optional scheme, which the Commission may re-activate if surpluses of milk products build up or are likely to occur, creating or likely to create serious imbalances in the market. The same applies to the aid for skim milk processed into casein and caseinates. When relevant, the Commission should fix the aids, taking into account the reference price, market conditions or may be fixed by means of tendering procedures.

Disposal aid for butter is shown in Table 2.49. It includes welfare schemes, aid to non-profit making bodies, aid for butter concentrate and aid to food processors. As explained above, the disposal aid for butter intended for food processors (namely for pastry and ice cream) was abolished under the Health Check reform.

Table 2.49 Summary of aided disposal of butter, 2000-2009, in 1000t of butter equivalent

Measure	*Regulation nr*	2001	2002	2003	2004	2005	2006	2007	2008	2009
Pastry		400	393	408	411	403	398	130	0	0
Ice cream		76	71	82	79	77	77	26	0	0
Total	*1898/05 Chap. II Ex 2571/97*	476	465	490	490	479	475	155	0	0
Non-profitm. organ.	*1898/05 Chap. IV Ex 2191/81*	29	27	27	24	24	22	22	18	12
Concentrated butter	*1898/05 Chap. III Ex 429/90*	14	14	14	15	15	15	5	0	0
Deprived persons	*3149/92*	32	27	3	27	34	45	24	0	0
Free sales	*2771/99*	1	0	0	44	11	50	29	0	0
Total		551	533	535	600	564	607	235	18	12

Source: DG AGRI (various years).

2.4.7 Article 68 (69)

Article 68 (Regulation (EC) No 73/2009, (previously Article 69 of Regulation (EC) No 1782/2003) allows Member States to grant specific support to farmers for a range of purposes. The specific support should not exceed 10% of the national ceiling for direct payments of each Member State (Regulation (EC) No 1782/2003). The purposes for which the payments can be used are:

- to protect the environment, improve the quality and marketing of products and to enhance animal welfare standards ;
- to address disadvantages faced by specific sectors, including dairy, in economically vulnerable or environmentally sensitive areas as well as for economically vulnerable types of farming;
- to ensure against land abandonment (whenever is a threat) and to address specific disadvantages of the farmers in such areas;
- to support for risk assurance in the form of contributions to crop insurance premia; and
- in the form of mutual funds to act against animal and plant diseases.

[6] Aid for school milk supply is not considered in this study since it will be subject to a separate evaluation.

The support should not be trade-distorting, most notably where Article 68 is used to fund agri-environment type measures beyond those included within Pillar 2. Proposals for payments under Article 68 need to be formally approved by the Commission. As with the rules for other direct payments, support provided under Article 68 is not subject to national co-financing.

For the evaluation period covered by this study (2003-2009/10) it is the expenditure of Member States under the (old) Article 69 and involving the dairy sector that is relevant. Spain is the only Member State where there has been expenditure under Article 69. This is reported in Table 2.50.

Table 2.50 Expenditures applied for and accepted under Article 69

	Total number of applications claimed	Corresponding amount (1000€)	Amount per application (€)
2006	27,445	19,763	720
2007	25,807	19,763	766
2008	24,212	19,763	816
2009	23,196	19,763	852
	Total number of applications accepted	Corresponding amount that has been granted (1000€)	Amount per application (€)
2006	26,780	18,571	693
2007	24,791	18,052	728
2008	22,368	18,143	811

Source: DG AGRI (unpublished).

More recently, other Member States (among them Belgium, Bulgaria, Germany, Estonia, Ireland, Latvia, Hungary, Austria, Slovakia and Finland) have defined specific support payments under Article 68, that might affect or target the dairy sector (European Commission, 2010a).

2.4.8 Rural development

Although rural development policies are horizontal policies that do not target any specific commodity or production activity, they might interact with policy measures aimed at the dairy sector. Dairy farmers are not only producers of milk, but usually also managers of fixed natural resources and capital (issues that are specifically addressed by the first two axes of the CAP's second pillar Rural Development policy). An indication of participation of EU dairy farmers in rural development activities, such as agri-environmental schemes, is given by the payments received by dairy farms for participation in projects under the Rural Development Programme (RDP). Data on dairy farm receipts of RDP payments are available from EU-FADN. It should be noted that this data source reports only total payments received without identifying payments specifically affecting dairy activities, or the RDP axis under which the payment was made.

Table 2.51 shows the ratio of RDP payments per average dairy farm relative to the RDP payments per average non-dairy farm (all other farms) for the period 2000-8. A ratio greater than 1 indicates that the typical dairy farm received more revenue from participating in RDP activities than the typical non-dairy farm in its Member State. For three out of the 15 MS (EU-15), notably Finland, Ireland and the UK this ratio is smaller than 1. For all other EU-15 countries the ratio is greater than 1. The ratio in Denmark is particularly high, falling below 2 only once over the nine-year period. These ratios have remained relatively stable for each Member State, although there are marked differences between Member States.

For most EU countries, the average payment per farm increased gradually over the period 2000-2008 (Table 2.52). The highest payments per farm were realised in the EU-10, notably in Slovakia and Czech Republic. In the EU-15 dairy farmers in Luxembourg, Finland and Sweden received relatively high payments per farm of approximately €20,000 in 2008, followed by Austria (approximately €10,000/dairy farm). Since 2003 Spain, the UK, Belgium and to a lesser extent also the Netherlands show a relatively strong increase in average rural development payments received per dairy farm. Although their growth rates were high, the average level of payments farmers in these Member States received is still relatively low. For a few EU-10 countries, the increase since 2004 has been particularly marked (e.g. Hungary and Poland).

Table 2.51 Ratio of RDP payments for dairy farms relative to all farms per EU-15 MS, 2000-2008

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Austria	1.17	1.24	1.07	1.07	1.13	1.08	1.10	1.17	1.13
Belgium	1.45	1.34	1.39	1.15	0.82	1.02	1.29	1.16	1.26
Denmark	2.40	2.27	2.37	1.97	2.68	3.21	3.52	4.89	4.25
Finland	0.85	0.89	0.92	0.89	0.90	1.03	0.82	0.93	0.95
France	1.62	1.51	1.52	1.47	1.57	1.56	1.64	1.78	1.71
Germany	1.27	1.21	1.46	1.42	1.28	1.34	1.42	1.33	
Greece		5.43	5.59	8.58			5.00		
Ireland	0.70	0.87	0.77	0.78	0.78	0.73	0.78	0.76	0.76
Italy	1.84	2.86	2.85	2.98	3.93	3.28	2.75	2.84	
Luxembourg	1.35	1.29	1.28	1.23	1.29	1.38	1.45	1.46	1.45
Netherlands	1.05	1.11	1.17	1.13	1.47	1.44	1.41	1.71	1.58
Portugal	2.42	1.85	1.42	1.14	1.40	1.62	1.34	1.66	1.66
Spain	1.85	1.72	1.07	1.33	1.77	1.52	1.46	1.87	2.29
Sweden	2.09	2.20	2.35	2.28	1.43	1.97	2.54	2.23	2.75
UK	0.37	0.27	0.28	0.25	0.32	0.30	0.38	0.35	0.37

Source: own calculations based on EU-FADN.

Table 2.52 Rural Development payments for dairy farms, 2000-2008, €/farm

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Austria	8921	10471	10129	10460	11491	11638	11707	10435	10484
Belgium	794	913	1124	1043	926	1280	1940	2289	2771
Denmark	1186	969	1224	1052	4401	2789	3564	3121	6252
Finland	12238	12768	13778	13691	15192	20225	15046	19627	20837
France	2407	2617	3176	3746	4280	4413	4531	4231	4108
Germany	3790	4174	5035	5338	5525	5691	6070	4984	
Greece		350	949	1974			3453		
Ireland	1356	3077	3302	3254	3768	4054	4936	5018	5091
Italy	1261	1795	2068	1416	1481	2482	1937	1898	
Luxembourg	14926	16278	17033	18067	18410	19265	20207	19909	20625
Netherlands	624	1420	1245	1151	1448	1792	1998	2121	2219
Portugal	1029	1204	1216	1272	1624	2267	2077	2131	2028
Spain	214	321	257	321	474	315	565	505	1541
Sweden	8625	11803	14558	12753	11335	15897	17245	17394	19824
UK	1741	1847	1797	1560	2181	2381	3942	4410	3882
Cyprus									
Czech Rep.					16469	20166	26147	26465	31943
Estonia					8968	10944	9231	9244	10478
Hungary					136	1768	2168	3924	4946
Latvia					3070	2834	4231	3422	3712
Lithuania					1999	1798	1622	1464	1785
Malta					1798	980	5394	16250	11303
Poland					79	581	1968	1052	1370
Slovakia					34048	86799	125537	135286	144122
Slovenia					2642	2789	2254	2734	2662
Bulgaria									75
Romania									19

Source: own calculations based on EU-FADN data.

2.4.9 Other drivers influencing the impact of EU policies on the dairy sector

This section reports on drivers other than the above discussed policies that can affect the dairy sector. To identify them and understand their importance, one should consider entire dairy supply chain (Table 2.53).

Table 2.53 Overview of drivers affecting different stages of the dairy supply chain

EU-Milk production: facing "new challenges"	• New challenges regarding o natural side factors (weather turbulences as e.g. drought or heavy rainfalls) o more volatile milk prices and prices for input factors o new competitors on the land markets (bio-energy, non-agricultural investors) o new/more social demands from consumers regarding animal welfare and environmental regulations • Increasing competition for input factors (especially land and qualified labour)
Dairies/Industry : ensuring high quality milk in adequate quantity	• Face regional re-orientation due to regional changes in milk production • Increasing impacts of world dairy market on EU markets influence a) prices, b) product portfolios and c) competition among EU-dairies for intra-EU-shares and Exports • Increasing margin pressure through higher pressure between retailers leading to more pressure on dairies
Marketing: meeting new consumer preferences	• New trends in consumers' preferences (climatic aspects, animal welfare, convenience, package sizes…) • Seasonal differences in milk quantity (different amplitude depending on the region and production system) • Demand volumes influenced more by increasing prices rather than by decreasing prices • Different consumers' attitudes towards the general value of food (e.g. higher in France than in Germany)
Logistics: facing higher complexity	• Increasing prices for fuel and energy • Increasing ecological awareness • More complex logistic activities related to diverging and more heterogeneous sizes/demands of farmers, component suppliers, dairies and retail markets/export
Retail, Consumption within EU/Export: more focused on world market developments	• Market power in the retail may change relative to other stages in the supply chain • Strongly depending on prices – not only for milk but also for supplementary goods (higher awareness of global developments on consumers side) • Without export subsidies more dependent on own competitiveness • Not influenced by changing consumers' preferences within EU but also globally • Non-tariff trade barriers • Exchange rate adjustments and fluctuation might affect competitiveness

Source: own compilation.

Dairy farmers are at the beginning of the supply chain. Their decisions on how much milk to produce and whether to continue dairying certainly depend on the level of the prices for which they can sell their raw milk and their confidence in prices remaining stable and sufficient to cover costs in the future. Price fluctuations and in particular price peaks either upwards or downwards as well as the occurrence of such events were named as influential for farmers decisions (see case study reports). Furthermore, the degree to which dairy farmers are affected by a policy reform depends on the degree of specialisation of the farm in a particular activity.

The next actors in the supply chain are the processors. Their product mix and the structure of the markets they sell to can affect their behaviours. The processors interviewed in the case study areas confirmed different behaviours depending on whether they are selling niche products and are therefore active in an inelastic market (e.g. special cheese types) or whether they sell on markets with more elastic demand. In the past, if they were active in international markets they could more easily cope with domestic changes because they use their international sales for absorbing the internal fluctuations. However, this flexibility has been reduced by the scaling down of export subsidies. Here again the product portfolio and the transition period of the policy reforms affect them as well. If the policy change is for a particular product and this is the only product they are processing and selling, then the processing companies are highly affected, while if the transition period is short and the policy reforms are not announced well in advance, then they do not have enough time to adjust.

Marketing strategies and the organisation of work can ease processes and establish an easy entry and access in markets if they are efficient and effective. With this are meant the type and the length of contracts among the actors, the existence of intermediates and brokers between the processors and the final consumers. These elements influence the price transmission over the supply chain and can create an own dynamic either stabilising or distorting the markets.

At the end of the chain are the final consumers, in both domestic and international markets. Changing consumption patterns can stem from new and more socially oriented demands from consumers regarding animal welfare and environmental regulations but also because of changing financial and economic conditions both in the EU Member States and in foreign markets. With respect to foreign markets, the processors interviewed also mentioned the importance exchange rate fluctuations or adjustments could have on the sector's competitiveness. While recent economic recession in several EU Member States may lead to different consumption patterns inside the EU, economic growth in big consuming countries such as China and India can potentially result in new world market balances and therefore new EU market balances.

The role of transaction and distribution costs ('logistics') should also be acknowledged. They add to the production costs of the final product. If market infrastructure and institutions function effectively and efficiently, these costs can be reduced.

Finally, the dairy supply chain is part of the agribusiness complex and as such dairy production and consumption is affected by additional factors that influence agricultural markets, including developments in the energy sector, both in crude oil prices and in biofuel markets, which affect not only the prices of feed-stocks but also the prices of agricultural land. Climate change and extreme weather conditions increase risk and uncertainty in agriculture and hence in dairying.

3 Intervention Logic of the CAP measures applicable to dairy

3.1 Introduction: Overview of EU dairy policy prior to the evaluation period

The common market organization for milk and milk products became operational on 1 November 1964. Its objectives were in line with the general principles for the common agricultural policy laid down in Article 39 of the Treaty of Rome (1958), namely (1) to increase productivity, by promoting technical progress and ensuring the optimum use of the factors of production, in particular labour; (2) to ensure a fair standard of living for the agricultural community; (3) to stabilise markets; (4) to secure availability of supplies; and (5) to provide consumers with food at reasonable prices.

Given that milk and milk products were heavily subsidised at national level by the six founder members of the EC and that milk production was perceived as "the basis of the farmer's income in the EEC" (EC, 1964)[7], the first objective of the original dairy policy package was to harmonise the different national policies in a politically acceptable way, that is without impairing the central role played by this commodity in supporting farmers' livelihoods. Thus, a high level of price support was built into the common market organisation for milk from the outset. As stated in an official communication (EC, 1964)' "the main objective of the market organisation for milk is therefore the ex-farm target price for milk with a fat content of 3.7% (Articles 17 and 18 of the regulation)". This price was to be supported by variable import levies, in order to insulate domestic dairy product prices from those on world markets, and by an intervention buying system that would take supplies of butter and skim milk powder (SMP) off the domestic market when their prices fell below an intervention price, store them and subsequently release them back onto the market when prices recovered. The rational use of such an intervention system is to stabilise within-year price movements due to (predictable) seasonal fluctuations and (less predictable but temporary) price shifts. It cannot *per se* function as a mechanism for more structural, medium term price support without involving the risk of increasing levels of carry-over stocks, with associated high costs of storage and product deterioration.

At the time the common market organisation for milk came into force, the EEC of six members had a joint milk surplus of about 1.7 million tonnes. Very quickly, the cost and magnitude of intervention stockholding became problematic. Regulation 25 of 1962, setting up the European Agricultural Guidance and Guarantee Fund and establishing the rules for financing the common agricultural policy, had made provision for the mechanism whereby surplus products could be exported with refunds (export subsidies) to third countries. Subsidised exports of butter and SMP from intervention and periodic 'distress' sales to targeted outlets on domestic markets were used from the 1970s in an attempt to manage the EEC's growing milk surplus.

In 1984, supply controls in the form of annual quotas on the amount of milk delivered to dairies and sold directly by farmers to consumers were introduced in an attempt to curb the ever more acute problem of surplus production. This measure was a compromise choice by the (then) ten member states, who could not agree on what would have been a more straightforward solution to the structural surplus, namely a reduction in price levels.[8] Although there had been considerable structural evolution of the milk producing sector and modernisation of milk production systems in some member states, it was considered that a price reduction of sufficient magnitude to deal with the surplus problem would be unacceptably damaging to many small farmers and specific rural regions. It is worth recalling that, until the 1992 CAP reform, which introduced direct income payments for farmers as a new instrument of the CAP, the common agricultural policy had no general policy mechanism for supporting farm incomes other than by means of market price, which cannot be used to target particular groups of farmers.

The total milk quota ceiling set in 1984 at EEC level represented a substantial structural surplus.[9] Thus, the problem of excess dairy production did not disappear with the introduction of quotas. However, the

[7] European Communities Joint Information Service, Newsletter on the Common Agricultural Policy No. 23, October 1964. Available at http://aei.pitt.edu/6328/01/003503_1.pdf.
[8] For the background to the decision establishing the quota regime, see Petit *et al.* (1987).
[9] In 1983, exports (in milk equivalents) were 8.9% of EU-10 production of cows' milk (of 113.4 million tonnes), and in 1984 (the first year of the quota regime, when production was over 2 million tonnes lower than in 1983

longer-term strategy was to reduce progressively the quota limits, and to allow the growth of internal demand (due to population increases and rising income) to further erode the magnitude of the surplus. Within several years of their inception, quotas on volumes were supplemented by quotas on milk fat, and producers' milk deliveries had to keep within 'fat-adjusted' quota limits. This was necessary because (a) the milk surplus problem, as manifest in the excess supply of particular dairy products, was due even more to its fat content than to its protein content, and (b) because producers initially tried to offset some of the impact of milk quotas on income by increasing the fat content of their delivered milk in order to improve the price they were able to get for it.

Over the ensuing 15 years, various smaller adjustments were made to the quota regime. On the one hand, overall quota limits were tightened several times (although the market was slowly growing with population growth) and the superlevy became even more dissuasive for producers. On the other hand, provisions for managing quota (including its transfer between producers and regions) were allowed to evolve within member states according to national priorities and preferences within general legislative guidelines laid down at EU level. These guidelines themselves had to be adapted several times to accommodate requests or *de facto* practices of member states (for example, short-term quota leasing was recognised and some regulatory parameters were defined at EU level although the decision whether or not to allow leasing was left to the member states). By the early 2000s, there was considerable divergence among member states regarding the modalities of operating the scheme[10] whilst the limits on supply and the consequences of exceeding them were rigorously observed through the Union.

With milk supply at last under control, the dairy sector was bypassed by the 1992 CAP reform, which focused on the arable sector. Nonetheless, the reform package of 1992 introduced a new approach to agricultural policy and new policy measures (lower, more market oriented intervention prices accompanied by direct payments) for cereals, oilseeds and protein crops that would also be applied to the dairy sector some years later. Indeed, in 1999[11], as part of the Agenda 2000 re-orientation of policy, it was agreed that a regime of lower intervention prices and direct payments would be extended to the dairy sector starting in 2005. The 2003 reform laid down the specific rules for implementing such a regime in the dairy sector, and the timetable for subsequently merging the direct payment for milk with the Single Farm Payment Scheme, which allocates to producers specific amounts of entitlements to direct income payments, based on historical production patterns and regardless of which commodities they are currently producing. Other long-standing elements of dairy policy (import tariffs, export refunds, provisions for subsidised public and private storage, consumption aids) were maintained.

This brief review establishes the historical background for the context within which EU dairy policy has been evolving over time. It is intended to explain why the common market organisation for milk at the starting point of the period covered by this evaluation was characterised by the particular set of instruments that were in place and to give the longer-term rationale for the set of policy objectives pursued during the evaluation period. In particular, the review of the objectives of EU dairy policy, based on legislation since 1999, shows the prominent place given to the objective of 'achieving market balance'. It has to be stressed that there is nothing specific to milk or to the dairy sector *per se* that makes it more difficult for these markets to avoid structural surpluses, *providing price is allowed to play its role of equating supply and demand*.[12]

3.2 Methodological considerations

A working document of the European Commission (2004) sets out the methodology for preparing the intervention logic, which is a first step towards drawing up the evaluation questions and defining the indicators. The intervention logic maps the links between the objectives of the policy to be evaluated, its implementation and its effects (see Figure 3.1).

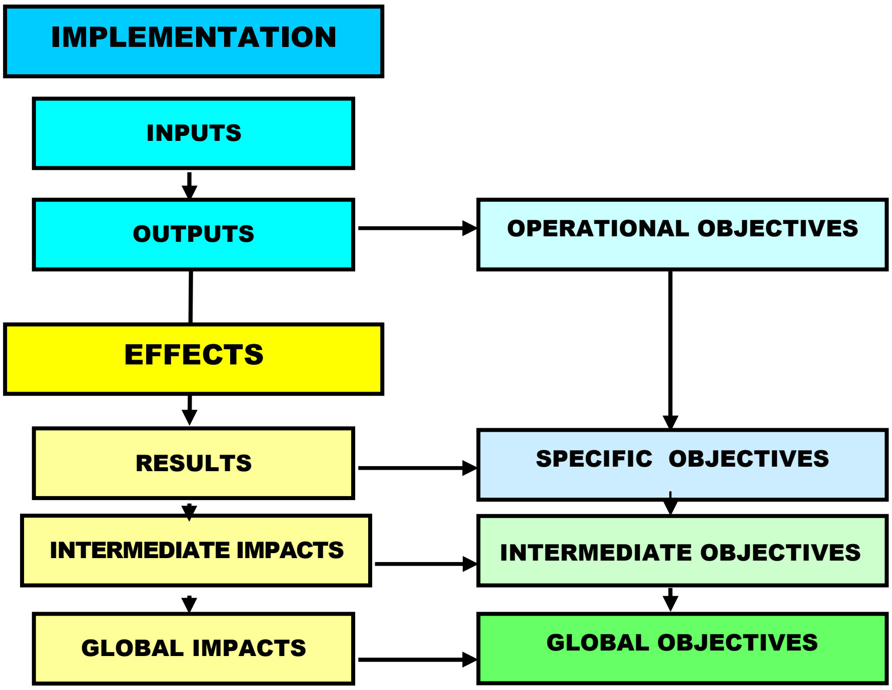
but the total community quota level was exceeded), this share rose to over 11% of EU-10 cows' milk production (figures based on Eurostat data, obtained from Burrell (1997).

[10] For an overview of practices regarding quota implementation in the member states, see Baldock *et al.* (2008).

[11] See Council Regulation (EC) No 1255/1999 of 17 May 1999.

[12] Whether unconstrained, self-equilibrating markets for milk would achieve an acceptable degree of price stability is another issue, and hence it is very important to distinguish between the concepts of 'market balance' and 'market (or price) stability'.

Figure 3.1 Hierarchy of Actions and Impacts



The same source links each stage of the hierarchy of implementation and effects to a hierarchy of objectives, starting with 'operational objectives' (corresponding to implementation outputs) and continuing with 'specific objectives', 'intermediate objectives' and 'global objectives'. In drawing up the intervention logic for this evaluation, we have tried to follow this scheme.

Inputs cover EU budgetary costs, but also costs to beneficiaries and third parties (member states, other organisations). There is no objective associated with 'inputs', which are treated as a given once it has been decided to conduct the policy.

According to the Commission methodology, an output is "a product, which is delivered by the Commission services. It is typically a product... When specifying output, you need to ask (i) what should be delivered, and (ii) at what time?". It follows therefore that suitability with respect to the objective and its timeliness are crucial criteria. In the dairy policy context, outputs would include the management services provided by the Commission as required by the regulations (for example, management of export refunds, discretionary decisions regarding public storage (intervention buying) and so on). Outputs are related to operational objectives.

Specific objectives refer to the physical implementation of particular measures. Our understanding of these objectives and the associated 'results' by which fulfilment of these objectives is to be judged, is that they relate to whether the policy measure was actually implemented as intended and whether it succeeded in attracting or reaching the intended beneficiaries.

According to the methodological guidelines, intermediate objectives relate to the short- and medium-term impacts of the intervention: it is against these objectives that short and medium-term impacts should be assessed. The corresponding indicators are called 'impact indicators'. Finally, the global objectives are intended to define the longer-term objectives of the policy, and the global impacts of the policy describe the longer-term consequences that the policy was expected to produce.

We consider that although unintended consequences and side-effects (of a negative kind) usually impose costs, they do not belong under 'inputs' (where the intended, foreseen or foreseeable) costs are allocated in the framework, but rather should be considered under 'intermediate impacts'. In this case, however, they will not have a corresponding 'intermediate objective' since by definition they were unintended.

The last two stages in the hierarchy (intermediate objectives/impacts, global objectives/impacts) are defined in the documentation in relation to *time* or the passing of time since the policy began: that is, they relate to what is expected and actually happens in the short- or medium-term, and what occurs in the longer-term. This methodology seems quite appropriate in the context of a single finite policy action that starts at a certain point in time and whose effects are intended to be fully achieved over a given period. The short-, medium- and longer-term notions used to identify these two sets of objectives and impacts can then be defined in relation to the intended life of the project, which starts with a clearly defined problem and aims to resolve it within a certain period.

In the case of an on-going policy agenda, however, like that of dairy policy, which as explained in section 3.1 has been evolving over decades, and which is characterised by a steady stream of legislation (substantial reforms interspersed with smaller adjustments to fine-tune existing measures) and inter-connected policy changes, applying all aspects of the methodology presents a strong challenge. For example, we have seen that 'improving market balance' has been a global objective – or a driving force - of dairy policy for the last 30 years or so. However, it is also striking that throughout that period, market balance has never been rigorously defined (in such a way that a scientific analysis could demonstrate categorically whether or not it has been achieved), nor have any quantitative or quantifiable targets been set for how much 'improvement' is expected within a given time frame, nor has any time frame or target date ever been set. This means that separating impacts of specific time-designated policy measures in terms of whether they occur in the short, medium or long term, and relating them to objectives that need also to be identified according to their positioning over time (short-, medium- or long-term) is rather subjective.

We have dealt with that challenge as follows. For the measures agreed in the 2003 Luxembourg package, we consider that (although some were not implemented for 2 or 3 years) enough time has elapsed to allow a full ex post evaluation of the *intermediate impacts* (i.e. short- to medium-term impacts) based on empirical indicators from all relevant sources (statistical collections of the Commission and Eurostat, data from external official data collections and the sample surveys that will be carried out for the specific purpose of this evaluation). The global impacts will be assessed in terms of the trends set in motion by these changes and whether they are likely to continue in the desired direction towards fulfilling the global objectives in the coming period. For later policy changes (in particular those of the Health Check package), it is too soon to attempt the same kind of evidence-based analysis of even the intermediate impacts.

A second challenge we faced in designing this evaluation, namely that the Commission's suggested methodology does not make explicit provision for evaluating a set of measures as a package. In explaining the approach to Evaluation Question 9, we set out our approach to evaluating a multi-objective multi-measure policy package as a whole.

The crucial conceptual stages involved in drawing up the intervention logic can be summarized as follows:[13]

- collect the official documents establishing the intervention and allocating resources.
- identify the main activities.
- identify the objectives.
- translate the objectives into expected results and impacts.
- connect the activities to the expected impacts by reconstructing the logical cause-and-effect relations (if… then…)
- check that cause-and-effect relations are logical, i.e. considered as plausible in the light of available knowledge.

The official documents used are ten regulations spanning the period 1999 to 2009. The first of these, Regulation (EC) No 1255/1999, serves as the benchmark for the policy changes to be evaluated in this exercise, namely policy changes introduced over the period 2003 to 2008-2009. The next three regulations perused (Regulations (EC) 1782/2003, 1787/2003 and 1788/2003) present the changes to dairy policy that emerged from the 2003 'Luxembourg' reform of the CAP that was completed in 2003. Three 'interim' regulations (Regulations (EC) 1898/2005, 1234/2007 and 248/2008) are also included. An *ex post* evaluation will be performed of these policies.

[13] List taken from a Commission document: EC External Services Evaluation Unit, Outcome and Impact Level Intervention Logic & Indicators: Methodological Approach. Source: http://ec.europa.eu/europeaid/evaluation/methodology/methods/mth_log_en.htm

More recent legislation, namely the two regulations based on the 'Health Check' of the CAP (Regulations (EC) 72/2009 and 73/2009), decided in November 2008, and the legislation covering the emergency support for the dairy sector (Regulation (EC) 1233/2009) in response to the crisis in milk markets of earlier that year, will not be covered. It is too early, on the basis of data available up to the end of 2010, to perform a reliable *ex post* evaluation of the impacts of the last three pieces of legislation.

The benchmark legislation (Regulation (EC) No 1255/1999) and the six ensuing regulations (up to and including Regulation (EC) 248/2008) have been analysed to identify the main policy changes affecting the dairy sector and the objectives cited to justify these changes. The causal mechanics translating the policy instruments into expected results and impacts are presented in the next Chapter (the theoretical framework). Whether or not the desired/expected causal relationships are fully logical and consistent with economic theory, or whether – even though theoretically sound - they are unrealistic given the constraints and the current situation of the dairy sector, will be analysed in depth in a later part of the evaluation. As the methodological guidelines referred to above (EC, 2004) state: "It should be noted that this preliminary structuring work need not always examine the intervention logic and causality in full depth; only to the extent needed for drafting the evaluation questions", and we have followed this advice.

3.3 Objectives and policy measures

This section presents in chronological order of the legislation the various policy changes and the linked objectives provided in the recitals contained in the preface to the legislation (see Table 3.1). A considerable number of diverse objectives are identified, some of which recur from one document to another. This reflects the complexity of the sector, the degree of intervention existing in the benchmark situation and to which the sector has traditionally been exposed, the fact that interventions take place in more than one segment of the chain, and the diversity of issues ('stakes') involved.

The legislative changes also reflect what has been a period of rapid evolution for the sector, and one that has seen unusual endogenous change and exogenously generated disruption. Not only has dairy policy been following its own internal strategy (the progressive elimination of the structural milk surplus whilst maintaining the viability and strength of the industry), but it has also been swept along by the more comprehensive systemic changes within the CAP (the bringing of virtually all common market organisations into a single framework, characterised by a switch of support from market price to direct decoupled payments). In addition, a two-year period of price turbulence that occurred on a global scale and for most major commodities also severely affected EU milk prices and incomes starting in early 2008. It must be stressed that, when interpreting the indicators and answering the evaluation questions in later stages of this work, it will not always be possible to separate out the impacts of these changes that are extraneous to dairy policy itself from the effects of the dairy policy *per se*.

Based on the systematic and comprehensive identification of objectives and policy changes in Table 3.1, it is possible to derive a grouping of the recitals under a number of summary headings:

- market performance (market balance, market stability)
- producer income
- competitiveness, market orientation
- consumption of dairy products
- structures, structural change
- policy simplification
- other (environmental standards, product quality)

Table 3.1 Dairy policy legislation (1999-2008): links between stated objectives (from recitals) and measures

Reg. (EC) No.	Recital number, stated objective	Associated measure
1255/1999 on the common organisation of the market in milk and milk products	(2) to stabilise markets and to ensure a fair standard of living for the agricultural community but in a standardized way so as not to impede the free movement of goods in question within the Community.	Intervention buying of butter and skimmed milk powder and the granting of private storage aids for these products.
	(3) to reduce the imbalance between supply and demand on the milk and milk-product market and resulting structural surpluses.	Continuation of the milk quota scheme and the "additional levy" (superlevy) until April 2008.
	(4) to stimulate the consumption of milk and milk products within the Community and to improve the competitiveness of these products on the international markets	Reduction in the level of market support through a gradual reduction of the target prices and intervention prices for butter and skimmed milk powder starting from 1 July 2005.
	(5) to maintain the competitive position of butter on the market and provide for the most efficient possible storage (particularly with regard to quality requirements).	Quality standards for intervention buying-in of butter (conditional on intervention buying being necessary to maintain market price stability, and being carried out under a tendering procedure).
	(7) to enable the best return to be obtained from milk proteins and to support the prices of products which have special importance in determining producer prices for milk.	Intervention buying and private storage aid for skimmed milk powder, with intervention subject to suspension when a certain quantity is reached and thereafter replaced by buying-in under a tender procedure.
	(9) to help balance the milk market and stabilise the market prices for milk and milk products.	Complementary measures increasing the possibility of disposing of milk products (including the grant of private storage aid for certain types of cheeses, and of aids for the marketing of certain milk products with a view to specific uses and destinations)
	(10) to stimulate the consumption of milk by young people.	Subsidy for expenditure on supplying milk to pupils in schools.[1]
	(11) to compensate for the reduction in market support in such a way as to keep the overall income support at the level of the Member States' total reference quantities as applicable when the Regulation comes into force.	Introduction of direct income support measures for milk producers in the form of a dairy premium (starting in 2005), based on the individual reference quantities, and whose the level will develop in parallel with the gradual reduction of market support.
	(12) to take account of heterogeneity across production areas of the Community and of structural and natural disparities, and the diverse needs resulting there from, that would not be accommodated by a rigid Community-wide scheme with uniform dairy payments to all producers.	Provision of a flexible framework of additional Community payments to be made by Member States within fixed global amounts and in accordance with certain common criteria; and in such a way as not to produce discriminatory effects or introduce market and competition distortions (Article 17, from 2005).
	(19) to prevent or counteract adverse effects on the Community market that could result from imports of certain agricultural products.	Imports of one of more such products should be subject to payment of an additional import duty, if certain conditions are fulfilled.

Notes: 1) This measure is not under evaluation in the present report.

Reg. (EC) No.	Recital number, stated objective	Associated measure
1782/2003 common rules for direct support schemes under the common agricultural policy and for certain support schemes for farmers	(21) To ensure a fair standard of living for the agricultural community. This objective is closely related to the maintenance of rural areas…	Introduction of a dairy premium (direct payment) as from 2004, phased in over 3 years, plus additional payments allocated by Member States.
	(24) …and so to maintain overall income support at the current level despite diminishing market price support and higher costs due to environmental and quality standards (not specific to the dairy sector)	Completion of the shift from production support to producer support by introducing a system of decoupled income support for each farm. Dairy premium and additional dairy payments to be incorporated in the Single Farm Payment no later than 1 January 2008.
	(24) Enhancing the competitiveness of agriculture, encouraging a more market-oriented and sustainable agriculture and promoting food quality and environmental standards requires a reduction in price support and will entail an increase in production costs. The aim is to increase the effectiveness of direct income aid, while leaving the actual amounts paid to farmers unchanged.	Introduction of cross compliance conditions associated with direct income support payments.
	To protect or enhance the environment, or to improve the quality and marketing of agricultural products (introduction to Article 69).	Article 69: Optional implementation for specific types of farming and quality production: Discretionary payments made from retentions of up to 10% from the national ceilings on direct payment funding.

Reg. (EC) No.	Recital number, stated objective	Associated measure
1787/2003 amending Regulation 1255/1999 on the common organisation of the market in milk and milk products	(2) To promote consumption of milk and milk products in the Community and improve their competitiveness on international markets, by reducing the level of market support.	Gradual reduction from 1 July 2004 of intervention prices for butter and skimmed milk powder set by Council Regulation (EC) No 1255/1999.
	(3) To simplify policy (reason given: since intervention for both products is now only applied for a maximum quantity and during a limited period of the year, and the target price, which served as an indication of the support level, was constituted especially by the intervention prices for butter and skimmed milk powder).	Abolition of the target price for milk.

Reg. (EC) No.	Recital number, stated objective	Associated measure
1788/2003 establishing a levy in the milk and milk products sector	(2) To simplify and clarify the milk quota scheme, and to benefit from the lessons learned from its past operation.	Repeal of Regulation (EEC) No 3950/92 (revising the milk quota scheme) and the rules governing the extended scheme should be reorganised and clarified.
(*extension of the milk quota scheme until 2015*)	(3) To reduce the imbalance between supply and demand on the milk and milk products market and the resulting structural surpluses, thereby achieving better market equilibrium.	Prolongation of the milk quota scheme for seven further consecutive 12-month periods starting on 1 April 2008.
	(8) To simplify the administration of the quota scheme.	Continuation of procedures for taking into account the fat-content of milk delivered (relative to individual reference fat content) when assessing deliveries relative to individual reference quantities.
	(13) To enable Member States to respond to specific situations (determined by objective criteria) with regard to the (re)allocation of quota among producers.	Simplification of the distinction between deliveries and direct sales. Henceforth, 'deliveries' are restricted to whole milk and 'direct sales' include sales and direct transfers of milk to consumers, as well as all sales and transfers of other milk products.
	(15), (16), (18) To facilitate rational structural development in milk production. (20) To prevent recurrent quota leasing from becoming an additional cost factor for milk production that might hamper the improvement of production structures.	(a) Member States may be allowed to incorporate reference quantities that have been unused for some time in to the national reserve to be re-allocated to other producers (after making provision for cases where producers who are temporarily unable to produce wish to resume production). (b) Member States may prevent long-term leasing of quota by producers who have ceased to produce, where it might run counter to structural trends and adjustments. (c) Member States may keep open the option to implement national or regional restructuring programmes, and may organise the transfer of reference quantities in other ways than through individual transactions between producers.
	(22) To regularise and stabilise the market in milk products.	Continuation of the superlevy on over-quota deliveries, but at an annually declining rate from 2004. Reminder that the revenue accruing from this levy should be used to finance expenditure in the milk sector.

Reg. (EC) No.	Recital number, stated objective	Associated measure
1898/2005 rules for implementing Reg 1255/1999 as regards measures for the internal disposal of cream, butter & concen-trated butter	In the interests of simplification, harmonisation, and clarity and rationality of the aid scheme, and because some provisions have not been applied for some years and the current market situation does not warrant keeping them.	Changes to Commission Regulation (EC) No 2571/97 on the sale of butter at reduced prices and the granting of aid for cream, butter and concentrated butter for use in the manufacture of pastry products, ice-cream and other foodstuffs.

Reg. (EC) No.	Recital number, stated objective	Associated measure
1234/2007 establishing a common organisation of agricultural markets & specific provisions for certain products (*Single CMO Regulation*)	(19) To contribute to balancing the milk market and to stabilising market prices.	Maintenance of the provisions for the granting aid for private storage in respect of cream, certain butter products and certain cheese products, and for discretionary aid granted by the Commission for private storage of certain other cheese products.
	(37) The main purpose of the milk quota system remains that of reducing the imbalance between supply and demand on the respective markets and the resulting structural surpluses.	Maintenance of the various features of the milk quota scheme laid down in Regulation (EC) No 1788/ 2003.
	(43) To contribute to balancing the milk market and to stabilise the market prices for milk and milk products.	Maintenance of measures (targeted marketing aids, aids for school milk[1]) to increase the possibility of disposing of milk products.

Notes: 1) This measure is not under evaluation in the present report.

Reg. (EC) No.	Associated measure	Recital number, stated objective
248/2008 amending Regulation (EC) No 1234/2007 as regards national quotas for milk	(4) in the current period and as projected to allow the Community to help satisfy emerging demand requirements for dairy products for Community and world markets in the current period and as projected up to 2014.	Increase of all Member States' quotas by 2% from 1 April 2008.

Table 3.2 reports the number of times each of these objectives was cited in the legislation reviewed as the justification for a particular policy innovation or policy change. It is stressed that the number of 'hits' recorded in the table should *not* be interpreted as indicating the relative importance of each objective, but only as recording the frequency with which it was invoked as a policy motivation *in this particular period*. For example, the objective of insulating domestic dairy product markets from world markets in order to allow the EU-wide policies in force to function is hardly mentioned, although these trade policies are a necessary condition for the operation of the domestic policies and a cornerstone of the CAP. However, during the evaluation period, there were no major changes in the relevant trade policies or policy settings.[14] Taking the period 2000-2009 as a whole (i.e. including the legislation associated with the 'Health Check'), it is noticeable that structures and competitiveness are more frequently cited as objectives once quota abolition has become enshrined in the legislation.

Table 3.2 Frequency of objectives linked to substantive policy changes, 1999-2008

	Benchmark	**2003 reform**	**Further measures**	**1999-2008**
Legislation	**Reg (EC) 1255/1999**	**Regs (EC) 1782/2003, 1787/2003, 1788/2003**	**Regs (EC) 1898/2005, 1234/2007, 248/2008**	**Total**
Objectives				
Market performance:				
Market balance	3	1	3	7
Market stability	2	1	2	5
Market orientation	4	3	1	8
Producer income	3	1		4
Competitiveness, market orientation	1	1	1	3
Consumption of dairy products	2	1		3
Structures, structural change		3		3
Simplification of policies		3	1	4
Other:				
Environmental protection		2		2
Product quality	1	1		2

By contrast, promoting the consumption of dairy products is no longer cited as an objective later in the decade. This observation, together with the discussion in Table 3.3, raises the question of whether consumption of dairy products within the EU is a policy objective in its own right, or simply a justification of one of the strategies used to achieve a better balance in certain dairy product markets. As the need for this type of market-balancing action has reduced during the period, it is not surprising to find that the objective itself appears to be hardly pursued by the end of the period. On the contrary, as regards structural change, after many years of quota during which structural change was arguably affected, and then as it became clear that the era of quotas was drawing to a close and dairy farms would operate in a more competitive environment, this objective has gained considerably in urgency.

[14] Trade policies have been particularly static during this period, given that multilateral trade negotiations are underway.

Table 3.3 Summary and discussion of the main objectives linked to substantive policy changes, 1999-2008

Objectives	**Background and comments**
Market performance *Market balance with more market-orientation*	Throughout the period, the structural milk surplus on the EU market built into the EU quota ceiling has needed to be addressed by policy measures. Achieving this objective has two aspects: (1) disposing of current surpluses using the various policy instruments available for that purpose; (2) creating incentives for a reduction in the structural surplus over time. For (1), the surplus has to be disposed of in a way that (a) does not undermine the aim of supporting the market price received by producers (b) is sustainable (c) is cost-effective. This means either increasing final demand disposals (domestic or export) or reducing supply. Over the longer term, aspect (2) has been achieved by a variety of means: (a) stimulating unsubsidized demand (b) encouraging milk producers to leave the sector (c) technological improvements that allow milk producers to achieve appropriate incomes with a lower level of price support (d) shifting support from market prices to direct payments. Shifting support to direct payments during the evaluation period marks a strong shift to more market-oriented policies. The market balance objective is invoked only once in the legislation reviewed to justify a trade measure, namely the raising of import duties if market balance risks adverse effects from imported products (recital 19 of Reg 1255/1999).
Market performance *Market stability*	Market stability refers both to the maintenance of a stable flow of dairy products to consumers at steady prices, and to stability of the price received by milk producers. Traditionally, this objective has related to within-year price and quantity movements caused by seasonality in yields and production systems (which is quite pronounced in some EU regions) or, less typically, to movements from one year to the next due to unusual meteorological variations. In 2008-2009, stability was challenged in a new way by extreme price movements, unrelated to domestic production conditions. It cannot be assumed that the same instruments are appropriate for addressing these different types of market instability.
Producer income	Milk production represents a long-term commitment (in terms of herd investment, infrastructures and human skill). It is often carried out in regions where there are few opportunities for other types of farming. Milk is a staple food commodity and highly perishable in its raw state. These and other factors underlie the strong weight that has been attached to the objective of supporting milk producers' incomes. This objective is regularly cited in the legislation relating to policy changes over the whole evaluation period. Moreover, it was the dominant motivation for the choices made when setting up the original common market organization for milk, the consequences of which are still being unravelled, with the aid of a broader and more appropriate mix of policy instruments, by the policy changes implemented during the evaluation period.
Competitiveness, market orientation	This objective, as expressed in the recitals, has various aspects, which include the degree of price competitiveness of milk and dairy products (not least on world markets), the extent to which milk producers are exposed, and able to respond, to market signals, and the quality of milk and dairy products on final markets. In the legislation reviewed, this objective has been invoked in support of various policy changes, including the laying down of quality standards for butter bought into intervention, the shift of support from price to direct producer aids, and the removal of market management measures that are deemed to be no longer necessary in the current market situation.
Consumption of dairy products	The expansion of dairy consumption is referred to as an explicit aim in several recitals, where it is always associated with a policy change linked to the objective of achieving market balance. Therefore, it can be questioned whether it is an objective in its own right, or whether it is cited simply to justify the use of a policy measure in the interests of a 'higher' (more fundamental) objective. A stronger case might be made that the objective of increasing milk consumed by school children is

Objectives	Background and comments
	motivated by nutritional concerns independently of any concern for market balance. Similarly, supporting the use of milk products as animal feed can be seen simply as correcting for a policy distortion to the price of an intermediate input. This objective has received little weight in the latter part of the evaluation period, as the structural milk surplus has come under better control. Moreover, most of the measures that relate to it have been dismantled or partly dismantled. This suggests that stimulating consumption has been largely a means to an end rather than an objective in its own right.
Structures, structural change	This objective recognises that the sector's structural evolution, when driven by market forces, is generally beneficial from an economic viewpoint, leading to herd sizes and geographical location of production that are more efficient and more economically viable. Policy intervention to prevent, cushion or re-direct endogenous structural change is justified to correct for the effects of market failure (e.g. when it leads to environmentally unsound outcomes), to relieve an unfair burden of short-run adjustment costs or in response to other over-riding objectives, such as maintaining farming in LFAs. It has been widely thought[15] that supply quotas, whether or not they are tradable or otherwise transferable between holdings, reduce the pace and distort the pattern of structural change. This is not explicitly mentioned in the legislation reviewed until Reg. 72/2007 (recitals 7 & 8), although changes in the 2003 legislation allow Member States to make temporary use and permanent transfer of quota more flexible for structural purposes.
Simplification of dairy policy	Simplification of dairy policy has been a recurrent objective over the period, consisting largely of discontinuing measures that have not been used for some time, or the need for which in the current and projected future period was considered to be no longer justified in terms of other objectives. Whilst the benefits accruing from this objective are clear (lower budget costs and/or policy transaction costs, better understanding of the policy package by stakeholders and so on), it is still necessary to evaluate the choice and the timing of the changes undertaken with this objective. In some cases, it may be asked whether changes made in the name of 'simplification' were not also driven by an implicit goal of rationalizing certain aspects of the sector, and whether there was any case where the budget or administrative savings were outweighed by costs borne by the sector or consumer.
Sustainable production and consumption	
Environmental protection	The objective of protecting the environment appears first in Reg. 1782/2003 in relation to cross compliance, and again as a rationale for measures under Article 69. It appears again in various recitals supporting the measures under Article 68 of the Health Check. In none of these cases is it specifically related to the dairy sector. This follows from the horizontal nature of the objective itself, and the fact that the dairy sector cannot be singled out as necessarily requiring specific or more targeted measures in this respect. However, it is appropriate that cross compliance and the use of Article 69 is evaluated with respect to the dairy sector.
Product quality	Product quality is invoked to justify standards for intervention butter, and again as one of the motivations for payments under Article 69. The stringent food safety and animal health standards with which milk and dairy products must comply within the EU are extensively addressed by other legislation and do not come under the common agricultural policy. References to 'quality' here relate to price-relevant differences in product characteristics, to regional product variations, and to other considerations that determine the attractiveness of dairy products to users and their marketability.

[15] See for example Hanf (1989), Colman (2002), Richards and Jeffrey (1997).

3.4 The intervention logic

Figure 3.2 shows the intervention logic of the legislation summarised in Table 3.1. A number of measures (new measures or change sin existing measures) are identified, and on the left-hand side of the figure they are linked to the regulations in which they were introduced or modified. The next vertical stack of blocks shows the expected results of these changes, and to the right, another stack of blocks shows the expected medium-term impacts of these impacts. Finally, the right-hand side of the figure summarises how these various impacts contribute to the longer terms goals of the policy.

This figure intends to capture at least some of the complexity and inter-related nature of links between instruments, results and impacts. It shows clearly that some measures act on more than one objective and have intermediate impacts that contribute to more than global objective. It also indicates that, during the evaluation period, successive legislation extended or reinforced measures already taken or at least already announced, in previous legislation. This makes the evaluation task more difficult than if it had to evaluate the impact of one single reform or legislative act. Apart from this, some impacts are spread over time, not just because of the finite reaction time of the producers to the policy changes, but also because policy changes were themselves 'staggered' over time, or implemented in different years by member states (e.g. the decoupling of the dairy premium, which had to be completed *by 2008*).

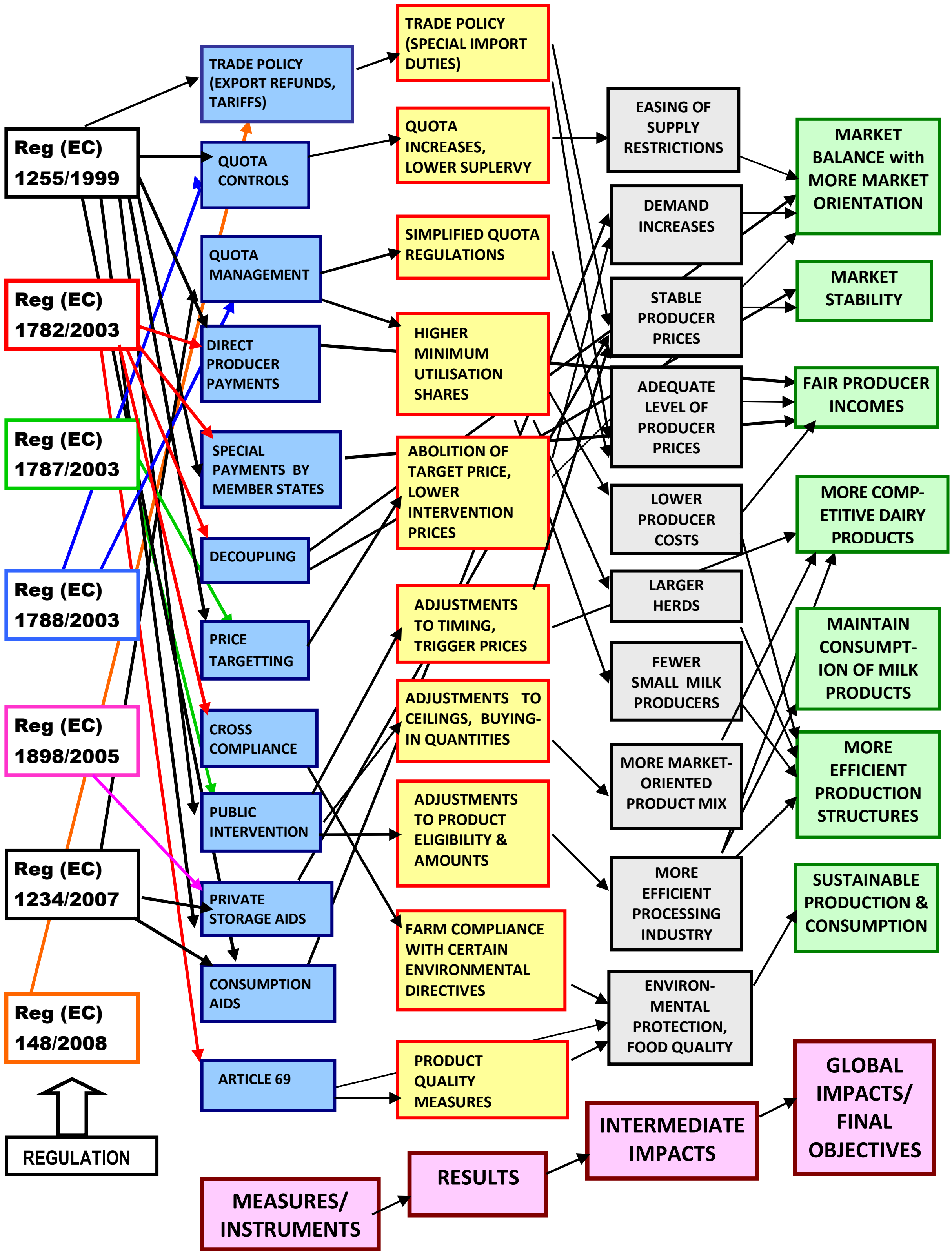
The intervention logic as set out above shows that the set of policy changes introduced during the evaluation period are interconnected and convergent in purpose: improving the market orientation and self-regulating capacity of the dairy sector, and maintaining sectoral incomes. They are also interlinked in terms of their effects – various changes have the capacity to enhance, constrain or increase the uncertainty of outcome of other changes. Moreover, although our analysis of the legislation enabled objectives (recitals) to be paired with individual policy measures (changes), many of the results are linked with several intermediate impacts, which in turn influence more than one of the global impacts.

The links between the objectives themselves (not shown in the figure but emphasised in the historical review and the theoretical chapter) are striking: the more beneficial structural change the sector can attain, the less time will be needed to achieve market balance whilst maintaining the incomes of the remaining producers. Alternatively, it could be stated as: the more quickly structural features can adapt to attain greater efficiency, the easier it will be to maintain the incomes of the remaining producers whilst improving market balance. The link between these objectives is price: efficiency-enhancing structural change lowers costs and 'fair' prices, whilst lower prices stimulates demand.

These inter-linkages highlight the main challenges of this evaluation, which are:

- to evaluate the effectiveness of individual policy changes in a context where the mapping between policy measures, outcomes and objectives is not one-to-one but many-to-many;
- to evaluate the set of policy measures together in terms of the set of joint outcomes;
- to go beyond the narrow evaluation of policies in terms of their expected outcomes in order to consider, as well, whether (a) additional, accompanying measures should have been taken (when they were not) (for example, in order to ease adjustment burdens or to help producers cope with greater exposure to market risk) and whether (b) any of the measures adopted had undesirable collateral effects that were not foreseen but that nevertheless should be taken into account when evaluating the policies.

Figure 3.2 Expected Intervention Logic driving Dairy Policy during the period 2003-2008



4 Theoretical analysis

This chapter contains four sections dealing with the market for raw milk (4.1), the operation of the dairy supply chain (4.2), trade measures for dairy products (4.3) and dairy income and the decision to quit (4.4).

The aim in all sections is to analyse the impact of policies on the behaviour of decision makers. The approach is therefore to introduce policy measures into stylised situations, or to change the settings of policy measures already in place, in order to analyse their impacts, *while holding constant all other possible but unrelated changes*. The policies analysed have been in operation over extended periods of time, during which other factors – which are important in the real world and in empirical analysis that attempts to understand real-world developments – have been changing. However, for a sharper understanding of what can be expected of the various policy measures *per se*, these other changing factors are deliberately assumed to be held constant unless otherwise stated.

4.1 The market for raw milk

In this section, the theory underlying the market for raw milk and the operation of policy measures that impact on that market is presented.

In order to simplify the presentation, it is assumed that the country is 'small' in relation to world trade. That is, changes in its domestic policies and the induced changes in trade flows do not affect world market prices for the relevant commodities. Trade aspects are dealt with explicitly in section 4.3.

Figure 4.1 Quota scheme (as sole measure) to support market price for milk

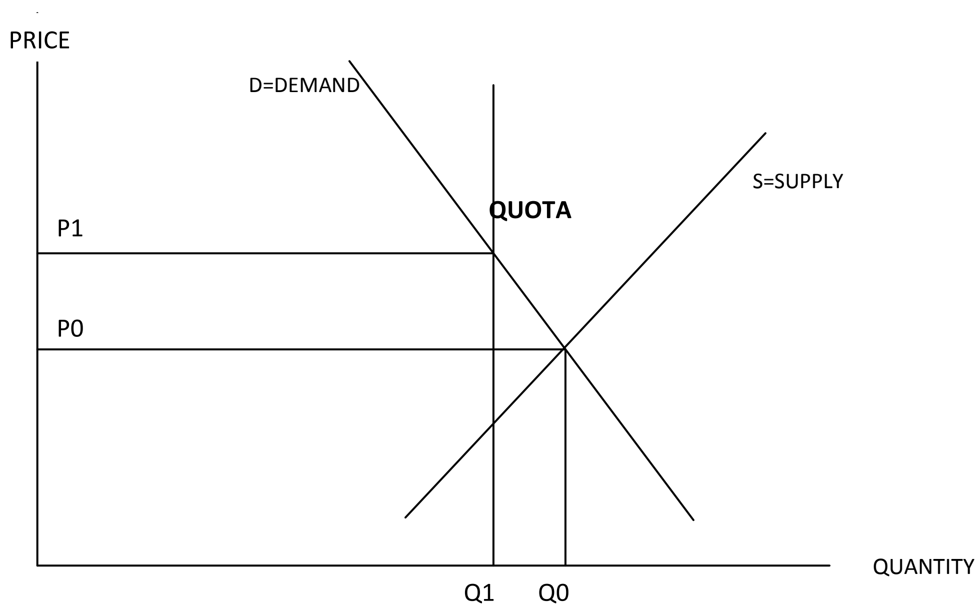


Figure 4.1 shows how a market supply quota alters the market outcome in a competitive market when there are no other policy measures in use and where, for simplification, it is assumed that there is no external trade. By definition, in this competitive market, no buyer or seller is large enough to affect the market price. The intersection of the milk demand and milk supply functions determine the no-intervention, perfect-competition market outcome, denoted by quantity = Q0 and price = P0.

When market supply is restricted by quotas to the level Q1, competition between buyers forces the price up to P1. At this price, the market for the smaller supply is balanced. The economic cost of the policy is borne solely by purchasers[16], since they buy less milk than they would buy without the policy, and they also pay more for what they buy. Producers, by contrast, gain in that, although they are producing less than without quotas, they receive more for each unit of milk, and even the marginal unit produced (i.e. the last, and hence most costly, unit that just fills the quota) is sold for more than its marginal production cost.

In this simple example, there are no budget costs of implementing the policy. However, in reality, in order to implement quotas, supply controls have to be enforced. This may be done by imposing limits on either producers or dairies (if all milk is sold through a dairy), or both, as has been done in the EU. Therefore, there are policy implementation costs involved that are not displayed in Figure 4.1. These costs may be borne from the government budget or may have to be absorbed by milk purchasers and hence passed on to final consumers.

In addition, it must be stressed that a market supply quota scheme is only feasible when the domestic market can be isolated from lower-cost imported supplies. If it were possible to import at prices above the pre-quota market-clearing level, quotas on domestic supply would be ineffective in raising domestic price beyond that level. As soon as the restriction on domestic supply started to cause market shortages and hence price increases, additional supplies would be attracted into the market from elsewhere and would prevent the market price from rising. The outcome would be the same marketed quantity as without quotas, but a smaller share of it would be provided by domestic producers. In the analysis so far this isolation holds as we assume the absence of trade altogether within the relevant price range.

The simplified situation depicted in Figure 4.1 does not represent the operation of the EU milk quota scheme for several reasons. First, other policy measures were already in operation prior to the implementation of quotas and they continued thereafter. Because of these pre-existing policies, domestic prices were already supported above world market prices. Thus, EU quotas were an *addition* to an existing set of price-supporting policies, whose sole purpose was to restrict supply and therefore to control the structural surplus. Second, although import controls provided and have continued to provide effective market protection at the margin, the world market has been an important outlet for *exported* surplus EU production under the EU quota scheme. This situation is shown in Figure 4.2.

In Figure 4.2, the demand function shows the total amount of raw EU milk demanded in the domestic market at different price levels, as before. This assumption is not necessary to the following discussion. Prohibitive import levies are assumed.

The domestic market price is given by P1, which is maintained at this level by a set of insulating trade measures (prohibitive import levies and export subsidies).[17] Over the short term, this price level is maintained relatively stable by the price-smoothing mechanism of intervention stocking of butter and SMP. Without any restrictions on domestic supply, producers would supply the quantity Q2.

Producers react to the price P1 by supplying the quantity Q2, whereas at this price only Q1 is demanded from domestic market participants. This leaves an excess supply of (Q2-Q1), which has to be disposed of by other means. One option is to sell the surplus in the world market, but given the price gap between domestic and world prices, this requires a subsidy of P1-Pw per unit of milk equivalent (see Section 4.3 for more details on these trade arrangements).

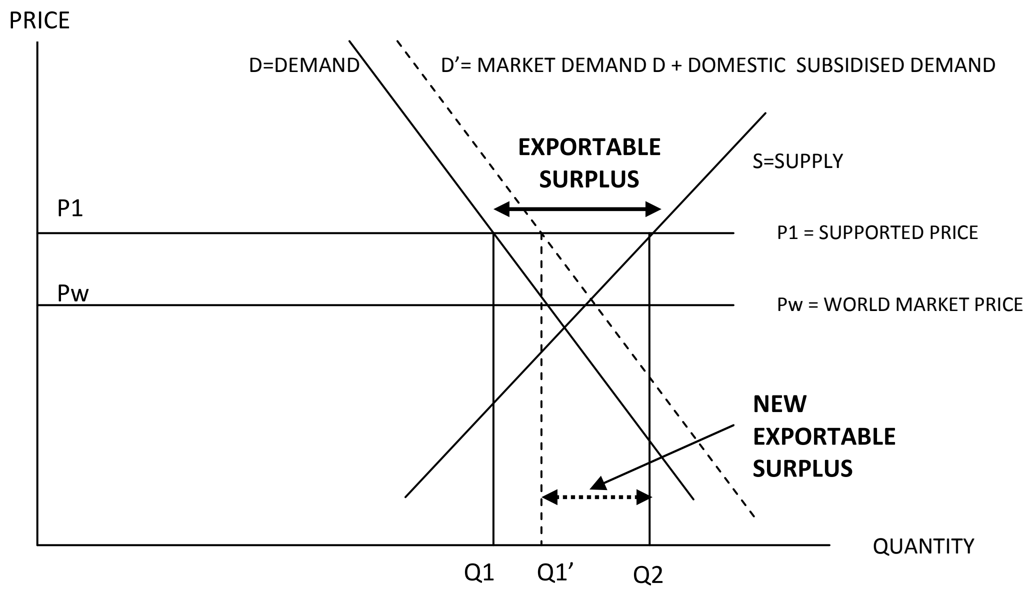
A further option is to increase demand by granting subsidies for the internal consumption of milk or dairy products. In the EU, this has been done by subsidising the consumption of certain products by closely targeted user groups (school milk, animal feed, the bakery sector, social groups designated by welfare criteria, etc.). This has the effect of pushing the domestic demand function to the right, resulting in the new demand curve D′, which increases the amount of milk that can be marketed internally to Q1′, whilst leaving Q2 unaffected. The exportable surplus is now the smaller amount (Q2-Q1′). It is not possible to read from the figure whether the cost to the government budget of subsidising the internal equivalent of Q1′-Q1 litres of milk is lower than the cost of subsidising its export. This is a policy-relevant question.

This analysis underlines the fact that when policies are in place that support price above market-clearing levels, for whatever reasons and however justified they may be, the price mechanism is unable to play

[16] When price transmission along the chain functions well, this cost is borne by the final consumer.
[17] For ease of comparison, Figure 4.2 assumes the same supported price level, P1, as in Figure 4.1 but this is a policy choice. Policy makers could choose different levels for the support price under each of the two regimes.

its fundamental role of balancing markets. If it is not possible to restore prices to their primary market-clearing function, then achieving market balance becomes a policy aim that requires additional instruments (such as export refunds and consumption aids). Their rationale is indeed to balance the market at the prevailing price. However, the market imbalance is itself due to the working of another instrument of the policy package.

Figure 4.2 Price support in the EU prior to milk quotas



Whether intervention buying or subsidised private stock-holding should be considered as further options for surplus disposal depends on the time frame considered. It is true that, *in the short term*, policy measures that take supply off the market and into storage allow the market to clear at a higher price than would otherwise be the case. However, the essential role of stockholding is to change the *timing* of sales into (final) demand. Stock-holding is subject to capacity constraints and limits on budget appropriations, and is sustainable in the medium term only if stocks can be released back onto the market when market prices improve. It is argued here, on a theoretical level, that intervention and other stockholding activities cannot be considered instruments of price support except in the short term. In the medium term, *which is the relevant one for the level of producer income support*, temporary withdrawal of supplies from the market can prevent price from falling below a minimum level but it also prevents price from rising as high as it would during periods when market conditions are more buoyant and stored supplies are being returned to the market. Thus, stock-holding *per se* has virtually no effect over the medium term on the average level of price support.

Of course, if stock levels are kept under control by the use of subsidised export sales out of storage, this quantity is not returned to the domestic market at a later stage and does indeed represent an increase in final disposal of the product. Therefore, some price support has been achieved. However, it is the subsidised export and not the stockholding *per se* that has supported the medium-term price. The transit of the product through storage has simply permitted flexibility in the timing of the product's disposal on the world market. Even if this change in timing has allowed the product to be exported with a smaller subsidy, it is the government budget that benefits, not the domestic producer price. It follows that, in the context of producer income support via market price support, stockholding should be classified as a price-stabilising mechanism rather than a support mechanism

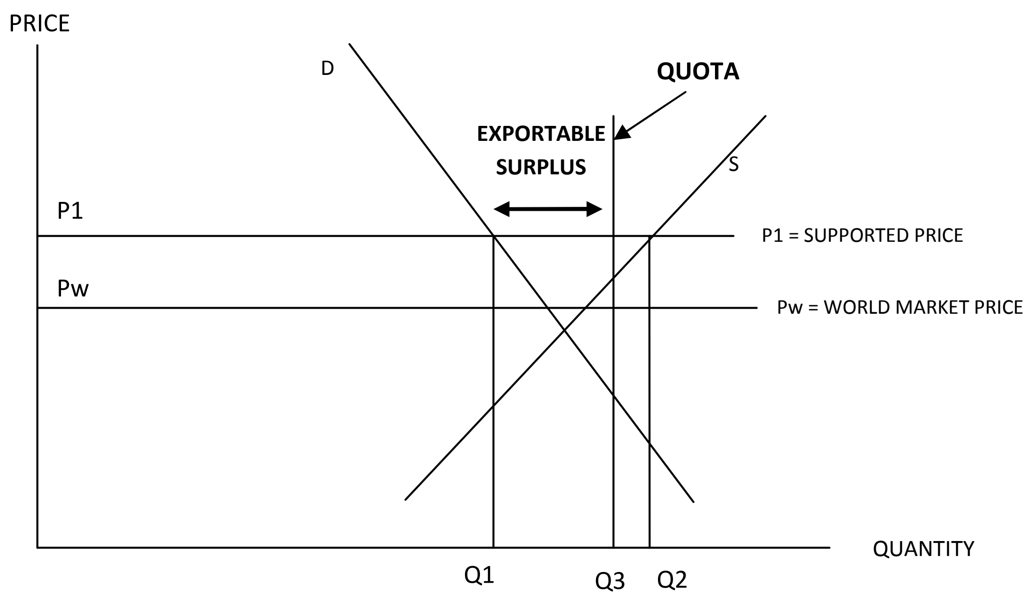
Three additional remarks are important at this point. First, the policy measures described above all relate to markets downstream from the market for raw milk. In all cases – internal demand subsidies, trade measures or product storage – the intervention takes place in a market for a processed product and not in the market for raw milk. Therefore, these measures are effective in supporting the producer price of raw milk in the first-point-of-sale market only under certain conditions. We return to this point section 4.2.

Second, if storage schemes are in place for some products but not others, this creates an incentive for processors to alter the proportions of processed products in favour of those with intervention buying or storage subsidies. If the ultimate destination of these products tends to be the world market, and if world market demand for these products has a smaller price elasticity than other exportable dairy products, then the bias in favour of storage for these more 'basic' products could exacerbate export disposal problems (see section 4.3).

In Figure 4.2, the cost of exporting the surplus depends on its size, and on the difference between P1 and the world market price in milk equivalents in the various product markets (not shown in the figure). The role of quotas, when introduced in the EU in 1984, was to reduce this cost by limiting the amount that producers could supply when price is P1. This is shown in Figure 4.3, where a quota limit is imposed on the market as a whole at the level Q3.

Third, the EU has historically been and still is a large player on world markets, the world market price on the relevant dairy product markets is not independent of the EU's export surplus disposal activities. As more subsidised exports enter the world market, the world market price is driven down. Maintaining the domestic price constant involves increasing the price gap between the domestic and world market price and the size of the per-unit export subsidy the EU has to pay. In addition, the fall in the world market price reduces the export revenues of other countries selling into the same world markets. Thus, there are additional costs (self-inflicted by the EU and costs borne by third parties) that are not depicted in Figure 4.2. This situation is analysed explicitly in section 4.3.

Figure 4.3 Quota scheme as a supply-control measure when market price support is achieved by other measures



When a supply quota of Q3 is imposed, the exportable surplus falls by (Q2-Q3), whereas the supported price and domestic demand remain unchanged. Under the assumption that EU trade in each dairy product is 'small' relative to the size of the world market[18] and that P1 remains the desired level of domestic price, the size of the price gap – and hence the per unit export subsidy - is the same, but the number of units requiring a subsidy is lower than before, and so the cost of export subsidies falls.

It is worth pointing out that, unlike the simple quota scheme presented in Figure 4.1, the combinations of measures shown in Figures 4.2 and 4.3 involve costs that are shared by purchasers (consumers) and the budget (tax payers). Although the economic cost to consumers is the same in all three figures[19], the policy packages underlying Figures 4.2 and 4.3 (internal demand subsidies, intervention buying and private storage subsidies (not directly shown) and subsidised exports) all have budget costs as well.

[18] This unrealistic assumption is relaxed in section 4.3.
[19] This follows from the arbitrary assumption that P1 is seen in all three figures.

Therefore, the total costs of the policies shown are higher than in Figure 4.1, whilst at the same time domestic producer benefits are also higher[20] - and greater in Figure 4.2 without quota than in Figure 4.3.

Figure 4.4 Switch from market price support to a direct payment, maintaining quota

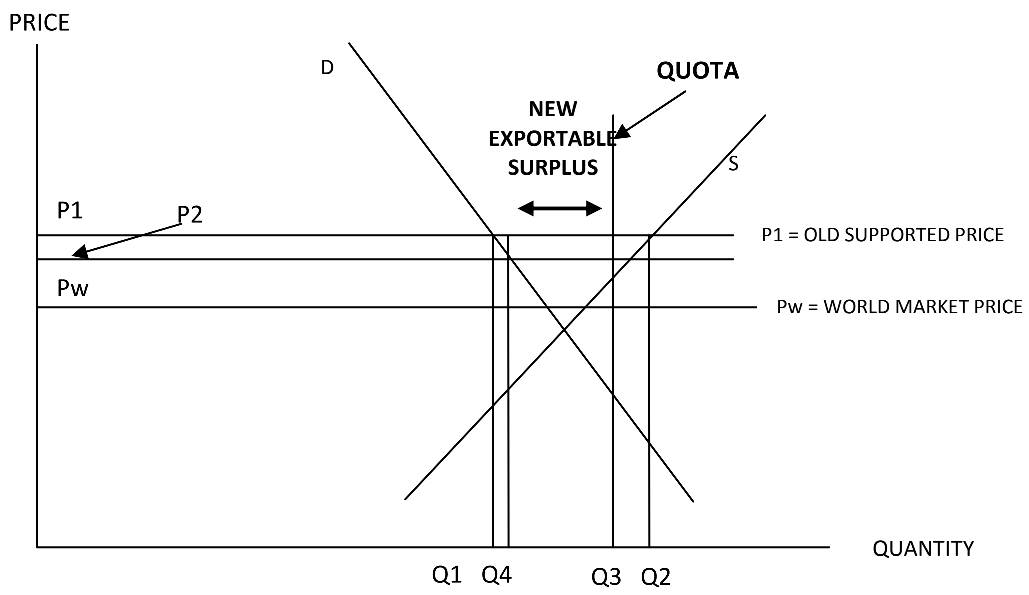


Figure 4.4 shows the situation when some support is shifted out of market price support into a direct income payment. The supported internal price is reduced to P2. Internal demand expands to Q4. On the supply side, the figure shows that quota is still binding at this lower price since at market price P2, producers would like to supply more than Q3 (intersection of P=P2 and the supply function, but are prevented from doing so by the quota). Thus, the total amount produced does not change. However, since internal demand is higher, the size of the exportable surplus (Q3-Q4) is lower. Moreover, the price gap between domestic and world market prices (P2–Pw) is also lower. Therefore, the total cost and the cost per unit of exporting the surplus is reduced.

At the same time, the direct payment that accompanies the market price fall has to be funded out of the budget. If the producers' lost market revenue is fully compensated, then this budget cost amounts to (P1-P2)$\times$ Q3. Whether this is greater or less than the saving on export subsidies depends on how much internal demand expands at the lower price, the size of the original price gap and how much it is reduced.[21] It has to be specified when defining the policy *how* the amount payable to each producer is calculated, together with other parameters such as duration of the payment, its transferability and transfer rights, and so on. In order to minimise any production incentive, the EU dairy premium was based on individual production levels but, in a second stage, rebased according to historic production levels, merged with the single farm payment and hence decoupled altogether from milk production. Based on other precedents, it is thus fully compatible with the WTO definition of a green box payment.

[20] This statement must be qualified. If the support to the sector encourages herd expansion and new entrants to the sector, the cost of land suitable for dairying, as well as other dairy-specific assets, will be bid up in the medium term and producers' fixed costs (the cost of using these assets for milk production) will rise. The extent to which the price support provided by the pre-quota package of measures shown in Figure 4.2 helps to maintain net farm income over the medium term depends on a number of case- and location-specific factors. When a quota scheme is added to the policy mix (Figure 4.3), the price support will tend to be capitalised in the value of quota (and its price, when it is marketable) since this is the most tightly controlled, and hence the most scarce, of the dairy-specific production assets. In both cases, support adds to production costs in the medium term, hence reducing farm income but boosting the income and wealth of (dairy-specific) asset owners who may or may not be milk producers. See section 4.4 for more discussion.

[21] Given the low elasticity of demand for milk and dairy products on the internal market, the result is likely to be an increase in budget expenditure. However, taking account of the reduction in the consumer's hidden subsidy to milk producers via the market price, the *total* economic cost of the income support is lower when a direct payment replaces some market price support.

The introduction of direct payments for milk brought all milk producers under the discipline of cross compliance.[22] If complying with these conditions were to increase the cost of milk production, this would appear in Figure 4.4 as an upward shift of the supply function. A small upward shift that is insufficient to bring supply within the quota limit would have consequences for producer income, but not for market outcomes. If costs were to rise sufficiently to move production to the left of Q3, this would further reduce the exportable surplus and would mean that quota limits are no longer binding.

Figures 4.2 and 4.3 relate to the market for raw milk (the first stage in the supply chain) and show a fixed level of supported price in that market. Therefore, they implicitly assume that it is the *milk* price that is supported, and that it is raw milk consumption that is subsidised. In fact, as already explained, all market price support measures apply to products that are marketed further down the milk supply chain. For example, virtually no liquid milk is exported beyond the EU borders; thus, tariffs are applied to traded dairy products. Consumption subsidies are for butter, skim milk powder and drinking milk; even this last product has for the most part already undergone one round of processing.

As long as the market into which milk producers sell their output is perfectly competitive, with all participants acting as price takers, then it can be safely assumed that the price support for processed products is transmitted back up the chain to the milk producer. For example, an increase in price support attached to butter and skim milk powder provides an incentive for the dairies producing these basic commodities to expand their throughput. In a competitive market, they will compete with each other to increase the amount of raw milk they can process, and this will bid up the raw milk price received by milk producers. Thus, the impact of the higher support for the transformed product is transmitted upstream to the producer of the primary product.

However, when price transmission in this first link of the chain is not working as it would under conditions of perfect competition, there is no guarantee that the support measures operating in the markets for transformed products will have their full potential impact on the raw milk price. For this reason, we turn in the next section to examine the way dairy policies operate all the way along the chain.

An important additional point should be made here. When quotas are the only measure in use and are effectively acting to support the milk price, as in Figure 4.1, the direct target of the intervention *is* the price of raw milk, and the direct beneficiaries of the higher price are in theory the milk producers. Therefore, the question of whether or not price transmission along the chain prevents support in downstream markets being passed back to milk producers is not relevant. Nevertheless, the extent to which the milk price is effectively supported when the quotas on raw milk supplies are the only support mechanism *does* still depend on how competitive the price formation process is in this first-stage market.

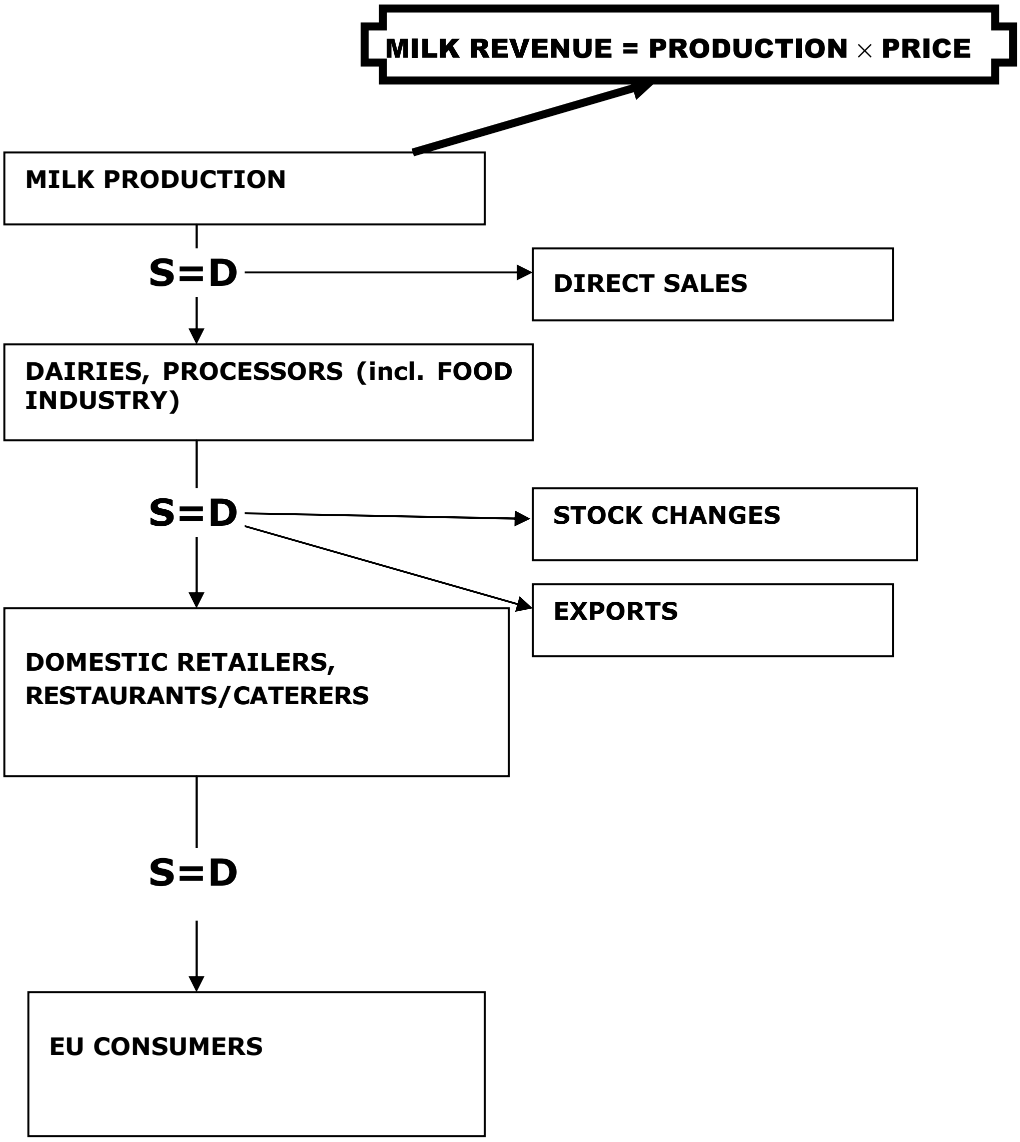
In Figure 4.1, the maximum amount of price support compatible with quota level Q1 is achieved when the first-stage market is perfectly competitive (that is, when no individual agents or collective of agents has any bargaining power). However, if first-stage buyers of milk have some bargaining power in this market, then they will succeed in capturing some of the price support.[23] This is precisely the same imbalance of bargaining power, should it exist, that would prevent support occurring in markets further down the chain being passed back up the chain to milk producers in cases where the support mechanisms are applied not in the raw milk market but in downstream markets. Thus, how much of *any* intended milk price support reaches milk producers does not depend crucially on which particular stage of the chain receives the price-supporting intervention, but rather on the balance of market power at each price formation 'node' of the chain and thus the degree of price transmission throughout the chain.

[22] Some milk producers were already subject to cross compliance conditions because of payments received based on past arable activities.

[23] In terms of the figure, the demand curve in a market where buyers are price-takers shows the *maximum* that they *can afford to pay* for each litre of milk, given transformation costs and downstream demand conditions. When purchasers have some bargaining power, the demand function shows the maximum they *need to pay* for each litre of milk after exercising whatever power they have over suppliers. In the figure, the demand curve in a market where buyers have market power would lie beneath the demand curve for price-taking buyers, i.e. at each level of output, a lower selling price is realised and hence the effective price support received by producers per litre of milk for the same fixed level of quota total is lower.

4.2 The dairy supply chain

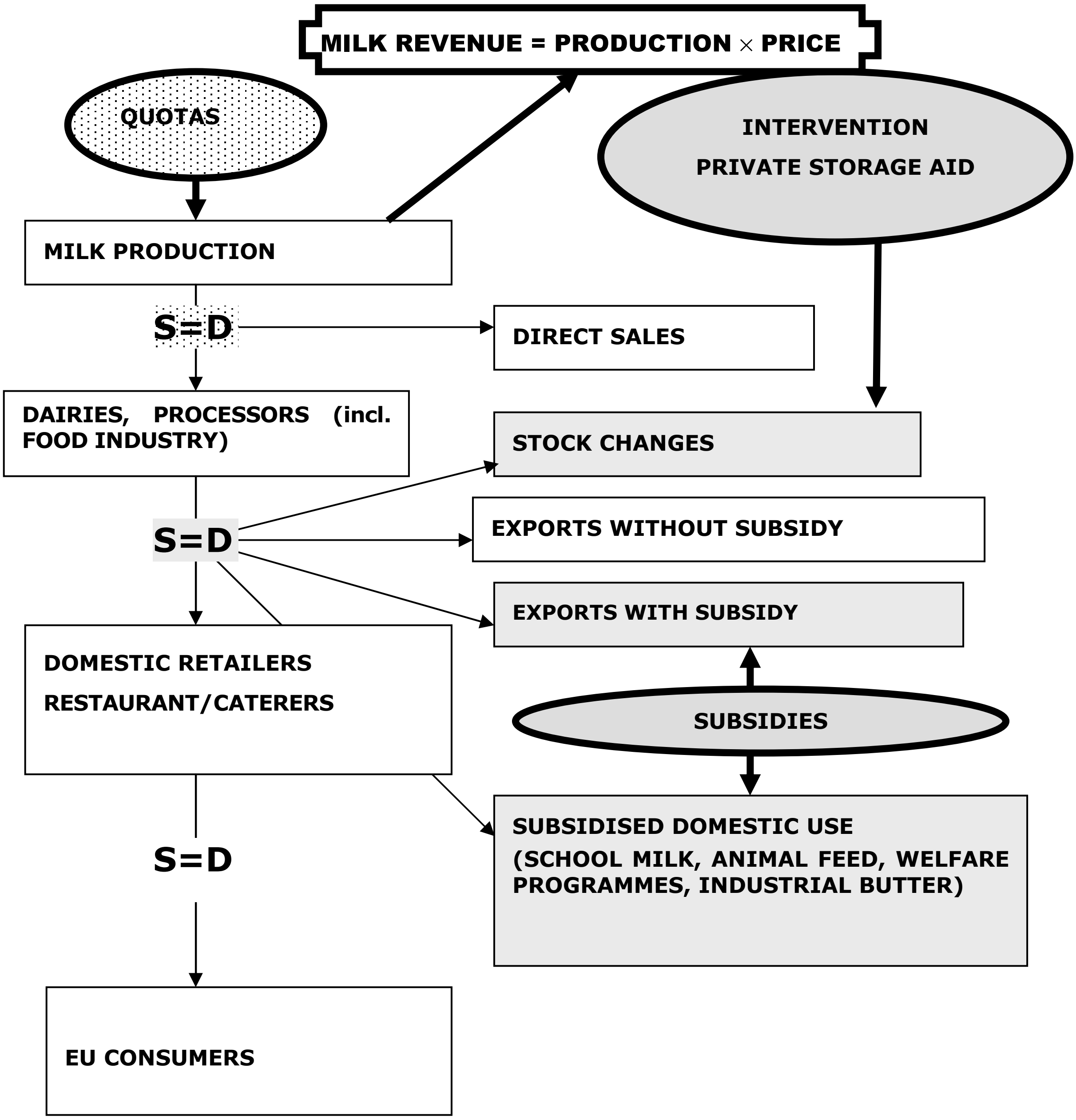
Figure 4.5 The stages in the chain



Note: S : supply; D: demand; S=D indicates market equilibrium.

In this simplified depiction of the dairy supply chain (see Figure 4.5), it is assumed that there are no imports. Although it is still the case that the volume of imports not benefiting from an access quota is quite small, a significant volume of imported dairy products (mainly butter and cheese) enter the EU under bilateral preference agreements or multilateral Tariff Rate Quotas (TRQs). They could be shown in Figure 4.5 and the following figures *either* as an additional source of supply, feeding into the retail segment, *or* as a lower volume of final consumer demand (which would then be interpreted as final consumer demand *for EU dairy products*). Since these import flows are largely the result of commitments made in WTO trade schedule, and were not changed in 2003, they are not considered as part of the policy package to be evaluated. It follows that, to keep things simple, they are omitted from the figures. Trade measures are treated in more detail in section 4.3.

Figure 4.6 The stages in the chain showing the main dairy policy interventions



Note: S : supply; D: demand; S=D indicates market equilibrium.

Figure 4.6 represents the situation prior to the 2003 CAP reform package. It is striking that all the explicit support measures (apart from quota[24], which, as shown above for a competitive market, impacts on price by limiting supply) relate to price formation mechanisms downstream from the milk producers. Implicit price support measures include the tariff barriers that allow EU domestic prices to remain at levels above those of the world market without attracting competitive imported products. These measures also apply effectively only to processed dairy products.

Insofar as the subsidies acting on the second stage of the chain boost demand for dairy products and help to clear the respective markets for dairy products, they contribute to the objective of achieving a

[24] It is important to point out that quotas are adjusted for the fat content of the milk. This is clearly due to the fact that in the past the surplus problems have always been more acute for the fat component of milk (butter) than for the protein component (SMP).

better balance between supply and demand, especially once the quantity of raw milk is more or less fixed by delivery quotas. However, the efficacy of such measures in supporting the price received by milk producers or stabilising that price, clearly depends on the price formation mechanism in the first link of the chain, namely between milk producers and dairies, as argued above. At the same time, it is also dependent on the price formation mechanism *downstream* from the supported market. For example, if retailers can act as price-makers in the market for processed products, they will be able to use their market power to capture some of the price support provided by policy measures in this market in order to keep down the cost of their own supplies. If this occurs, then even if the dairies and wholesalers are price-takers in the raw milk market or, despite having structural advantages in that market nevertheless act like price-takers rather than using their market power, the price support available for transmission back up the chain to milk producers will be reduced because of the market imbalance further down the chain.

For completeness, stockholding is also shown in Figure 4.6 although we consider that it can act as a price support measure only on the short term (see Section 4.1) and that it should more properly be classified as a price stabilising measure rather than a price support measure. Figure 4.6 emphasises that intervention buying and subsidies to stockholding apply in downstream markets, not in the raw milk market. Hence, just as in the case of price-support measures, their effectiveness in stabilising the milk price depends on the price formation process and the resulting degree of price transmission in upstream markets.

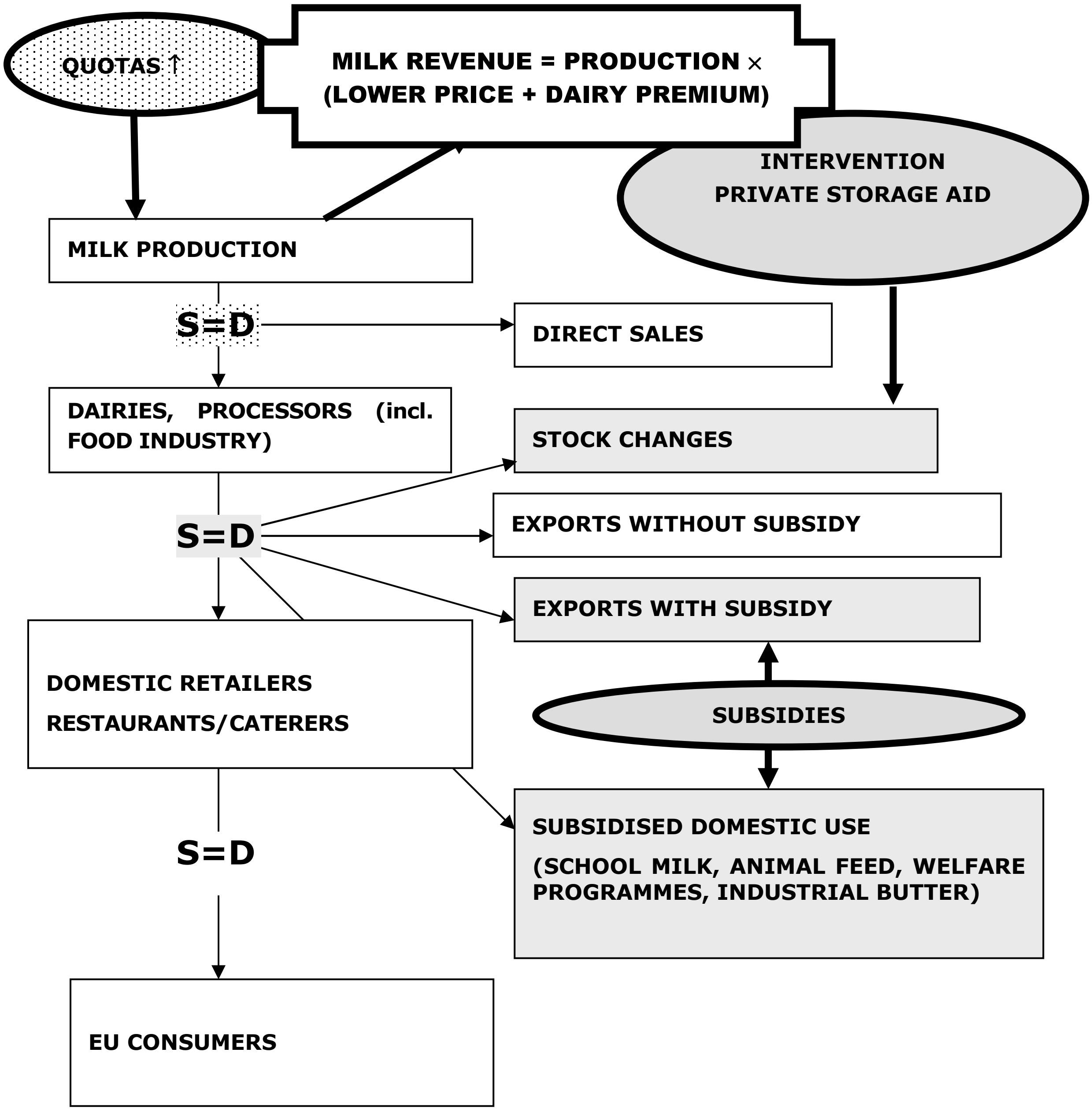
Figure 4.7 represents the situation as envisaged by the 2003 reform, but before the decoupling of the dairy premium. It is expected that, with the gradual relaxation of quota, more milk will be produced, thus putting downward pressure on the milk price (quantity effect on milk price). The lower milk price will be supplemented by the dairy premium paid directly to farmers, which is intended to compensate for the fall in market price support. Even when the dairy premium just compensates for the price fall, whether or not milk income remains unaffected depends on the extent of the production increase and the extent, if any, that cross compliance constraints increase milk production costs.[25]

Therefore, the impact on farm incomes of these changes depends on three unknown factors:

- by how much does production increase? That is, do producers do fill the expanded quota?
- what consequences, if any, does the introduction of cross compliance have on milk production costs?
- does the price formation process at the various links in the chain continue to function as it has in the past, or do changed circumstances downstream (i.e. the withdrawal of some consumption subsidies and the lower intervention prices and ceilings) change the behaviour of some market participants? That is, do these changes in other segments in the chain provoke endogenous behavioural shifts that affect the market for raw milk and the price received by milk producers in unexpected ways?

[25] For example, restrictions on manure production and handling, the identification and registration of animals regulation, animal welfare protocols (such as requirements with respect to the housing of calves).

Figure 4.7 The stages in the chain showing the main dairy policy interventions and the effect of the dairy premium



Note: S : supply; D: demand; S=D indicates market equilibrium.

Furthermore, if there is a fall in the producer price of raw milk, the extent to which consumers benefit from the lower milk price depends on the functioning of the second and third price formation mechanisms in the chain. If the price fall is not passed on from dairies to retailers, and from retailers to consumers, there will be no impact on consumer prices. If this should happen, then the increased milk production due to an expansion in quota will not be taken up by increased consumer demand, and this would leave more product available for export. However, if export outlets (subsidised and unsubsidised) are saturated at current prices, further downward pressure would be exerted on the milk price.

When the dairy premium is decoupled from milk production, it is no longer necessary to remain in milk production in order to receive it. If the pressure on price is such that production costs are no longer covered by price plus direct payment, the incentive to remain in milk production is low and an acceleration in the rate of exit from milk production is likely.

These expected changes are summarised in Table 4.1.

Table 4.1 Expected impacts of main policy changes (arrows show the direction of the effect)

	Factors expected to affect			Consequences for milk income
Stage	**volume produced**	**number of milk producers**	**producer price for milk**	**milk income = revenue minus costs**
Pre-2003 reform	quota limits binding	following a secular decline	following a secular decline[26]	falling price trend offset by yield increases
Post-2003 reform Stage 1 (price ↓ + dairy premium)	▪ quota limits still binding in most Member States ▪ lower superlevy unlikely to be a production incentive	following a secular decline ▪ post-2013 uncertainty↓ ▪ need to produce in order to get MP↑	▪ lower intervention ceilings → price instability ↑	▪ dairy premium intended to offset fall in market price = ▪ costs of cross compliance ↓/-
Post-2003 reform Stage 2 (decoupling of dairy premium, intervention/ storage ↓	▪ more quota ↑ ▪ decoupling ↓ ▪ price pressure (if in excess of compensation from DP) ↓	▪ lower prices ↓ ▪ decoupling removes production as condition for receiving DP ↓	▪ more quota ↓ lower intervention prices and ceilings + withdrawal of storage aid → price instability ↑	**Expected outcome: Higher volume** (quota increase) plus **structural rationalisation** (post-decoupling) will maintain the income of producers who remain in production

Table 4.1 summarises the main theoretical predictions concerning the impacts of the two stages of the 2003 reform on several key variables and on one of the objectives of the policies, namely milk producers' income. These two post-2003 stages correspond to before and after decoupling of the dairy premium. The table reveals that the package of changes set in motion is expected to impact on farm incomes in a complex way. By the end of the period, the net impact of this package on the incomes of milk producers who continue in production depends on a number of uncertainties:

- the extent of the structural *rationalisation* following decoupling, and its characteristics (in particular, whether this process has kept the efficient competitive producers in production whilst allowing or encouraging marginal producers to exit)
- the *utilisation* rate of the higher quota limits such that, by expanding in size, continuing herds can exploit economies of size and remain viable
- the extent of the *downward pressure* on price, and whether the (decoupled) dairy premium turns out to provide an adequate compensation for the price fall.

In evaluating the policy changes, one can ask a number of general questions:

- Was the policy outcome, as summarised in the bottom right-hand cells of Table 4.1, a reasonable one to expect, given the expectations at the time about world market conditions and producer behaviour?
- Was sufficient account taken of the cumulative effect of the whole package, over and above the effect of each policy change considered in isolation?
- Were the assumptions about the speed of adjustment (in particular, the mobility out of the sector) reasonable?
- Given that the strategy, as summarised by the challenge defined in the table, relies on rapid structural change, but change that favours the retention of the most competitive producers, were

[26] In real terms. In nominal terms, the EU producer price for milk was fairly stable from the mid-1990s to about 2000, it then declined very gradually from about 2001 until mid-2007. This was followed by an extreme price peak, and a sharp fall to a low of €24-26 per 100kg, since when it has gradually recovered to the level of the early 2000s.

appropriate structural adjustment policies put in place (e.g. safety nets, mobility incentives, information explaining the rationale of the changes, who should benefit and how)?

- Since most milk output moves along a complex chain before reaching the consumer, and since some support measures applied to the sector actually apply to dairy products and act on downstream stages in the chain rather than directly on primary milk producers, was it reasonable to embark on reforms to ensure greater market orientation and a greater role of the 'market' in the milk-producing sector without considering the potential market power and the marketing strategies of other players further down in the chain, in the light of their potential in a less regulated primary sector to unduly influence the 'market-determined' producer price for milk?

4.3 Trade measures for dairy products

As background to a theoretical overview of the trade measures in place for the dairy sector, it is useful to compare the situation before and after the changes enshrined in the Agreement on Agriculture of the WTO Uruguay Round Agreement (URA), which was signed in 1994 and fully implemented by 2000. Prior to the URA, agricultural trade remained outside the discipline and obligations imposed by the General Agreement on Tariffs and Trade (GATT). This was in part because special exemptions were accorded to agriculture (for example, as regards the use of import quotas), and in part because various other trade measures that were heavily used by various countries for agricultural protection were not covered by GATT rules at all (such as the use of variable import levies and variable export subsidies).

The key EU trade measures for major agricultural commodities consisted of variable import levies (VIL) and variable export subsidies (VES). The variable import levy for a product was adjusted its world market price varied, in such a way as to keep the entry price (i.e., the price of the imported product on the domestic market = Pw + VIL) at a steady level (the 'threshold price'). For products that, at the high domestic price, had a structural surplus that had to be exported, a subsidy paid from the EAGGF, was needed to cover the price gap between the domestic and world market price. The export price on the world market (Pw + VES) was set at a somewhat lower level than the entry price, and the VES was also adjusted as a function of fluctuating Pw in order to keep Pw + VES relatively constant.

For chronically surplus products, it is this price (Pw + VES) that more or less set the price level in the domestic market. In cases where EU self-sufficiency was less than 100%, the domestic price corresponded to the entry price, Pw + VIL.

Because the VIL and the VES varied inversely with the world market, EU domestic agricultural prices were insulated from world price movements: not only were they protected against exogenous world market *price instability* (whilst instability originating internally on the domestic market was in the short run counteracted by intervention buying), but these price levels could in the medium term remain independent of world market *price trends*. However, this was at the expense of escalating budget expenditure on export subsidies.

The URA imposed a number of important changes on this set of measures (the details below relate to the situation at the end of the 6-year transition period 1995-2000).

Market access

Import duties: variable import levies became illegal and were replaced by their tariff equivalents, based on the effective protection for each tariff line afforded by the border measures in place during 1986-88. These tariffs were bound and the bindings had to be reduced by an average of 36% (minimum reduction for a particular tariff line of 15%). Unlike some major trade competitors, the EU did not reduce tariffs on a selective basis but rather imposed the straight 36% cut on all agricultural products.[27]

[27] The complex, and in some respects incompletely specified, methodology for calculating tariff equivalents allowed countries to report the most 'favourable' base-year tariff equivalents as the basis for the agreed reductions. This produced the phenomenon known as 'water in the tariffs' whereby, even after the full agreed reduction had been imposed on the base-year tariff equivalent, the difference between bound tariff and the actual equivalent import duty in 1986-88 could be relatively small. Ingco (1996) estimated that the actual (average) tariff equivalent for EU dairy products was 177% in 1986-88 whereas the (average) bound tariff

When an *ad valorem* tariff was chosen for the bound tariff, the entry price (Pentry) became a function of the world market price (Pw) as follows: Pentry = Pw(1+t) where t is the *ad valorem* tariff rate ($t \geq 0$). With this option, the price gap between entry price and world market price ($t\times$Pw) is always a constant percentage of the world market price. For some products (notably some dairy products), the EU chose a mixed tariff regime (part *ad valorem* tariff/part specific tariff). In these cases, the entry price (Pentry) is related to the world market price (Pw) as follows: Pentry = Pw(1+t) + Tspec, where Tspec is the specific tariff (an amount fixed in euros) and the total tariff is $t\times$Pw + Tspec. Thus, when world market price falls, the protection afforded by the *ad valorem* part of the tariff falls proportionately whilst the specific tariff remains fixed, and hence the total protection *as a proportion of world market price* increases. By contrast, when world market price rises, the protection afforded by the *ad valorem* tariff rises proportionately, whilst the specific tariff is unchanged and the share of total protection due to the specific tariff declines. This non-linear relationship between entry price and world market price provides *relatively* more protection for the domestic market when world market price is low than when it is high, in the spirit of the banned variable import levy. However, unlike the VIL, it cannot insulate domestic prices against world market price movements; it can at most smooth the troughs of these fluctuations, and it does allow longer-term price trends to be transmitted to the EU domestic market.

Current and minimum access: preferential access concessions ('current access') had to be maintained, and if for any commodity line they amounted in total to less than 5% of domestic consumption during 1986-88, then additional 'minimum access' concessions had to be granted on a non-discriminatory basis up to a minimum of 5% of that consumption level. The EU already had current access arrangements for some dairy products with, among others, Australia, New Zealand and Norway. Additional concessions were granted. These concessions are administered by the use of TRQs that allow quantities up to the quota limit to enter at a lower ('in-quota') rate of tariff. Imports beyond this amount are subject to the full tariff rate. This provision was intended to allow some import penetration into markets even when corresponding bound and applied tariffs remained at prohibitive levels. However, the agreement did not stipulate *how much* lower the concessionary in-quota tariff should be than the full rate, and there were wide differences between countries and products.

Export competition

Subsidised exports: for each product line, the quantity of subsidized export and the expenditure on export subsidies were both bound at their levels of 1986-90. The bindings on volumes had to be reduced by 21% and those on expenditure by 36%. This effectively ended the ability of the EU to use the world market as an unconstrained outlet for surplus dairy products and, given the further increase in subsidized exports of some dairy products in the early 1990s, it meant that from the start of the Agreement these ceilings were already sharply binding, with repercussions back onto the domestic market and domestic policies.

The above measures were all in force during the evaluation period of this report. The specifics of bound rates, ceilings and so on for each signatory member are contained not in the Agreement on Agriculture itself, which merely sets out the principles of the Agreement, but in the voluminous Country Schedules annexed to the Agreement. Since the next round of World Trade Organisation (WTO) multilateral negotiations, the Doha Development Round, began in 2001 and was underway with varying degrees of urgency throughout the whole period, there have been virtually no changes to EU trade policies and their settings since the end of the UR implementation period (2000). However, due to somewhat better market balance in the domestic markets for dairy products and increasing demand for some EU dairy products (notably cheeses) at unsubsidised prices in some high-income countries, it has become somewhat easier than in the late 1990s/early 2000s to operate within the subsidised export commitments.

Further to the above mentioned major changes, disciplines were also imposed on the total amount of 'domestic support' that countries could use for their agricultural sectors. This category of support includes not only the effects of border measures but also effects of non-border measures (such as deficiency payments, output subsidies and so on) that have trade-distorting potential. The disciplines relating to 'domestic support' are not product or sector specific but rather they apply only to support as

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would be 178% in 2000. Most major agricultural trading countries took advantage of such opportunities, at least for some of their most protected and most domestically sensitive products.

an aggregate (although it *is* stipulated that total support granted to an individual commodity cannot exceed its 1992 level), and therefore we do not elaborate on them here.

Two provisions of the Agreement relating to domestic support are, nevertheless, relevant to the changes in EU dairy policy during the evaluation period. These are, first, that that no new domestic support measure can be introduced unless it satisfies the conditions of the (Annex 2 of the Agreement) 'green box' (Article 7: 2(a)) and, second, that direct payments made under production-limiting programmes are not included in the aggregate that is subject to a reduction commitment *if* (inter alia) they are based on fixed area and yields (Article 6: 5(a)). This helps to explain the design of the dairy premium and its subsequent mutation: when it was first introduced (and linked to milk quota reference quantities), it arguably complied with the Article 6 provision, whereas once it was fully decoupled it could be defended as complying with green box definitions, even in a post-milk quota setting (i.e. with no production-limiting programme).

Having said this, the WTO Agreement was almost certainly not the prime motivation for the specific form taken by the dairy premium. It is much more likely that it was motivated by the intention to harmonise and simplify the CAP across the major commodities. Since payments to the arable sector had already been reformed in a similar way – i.e. decoupled from current production and then merged in a non-product-specific payment (and for that sector one could plausibly argue that WTO guidelines *were* a major factor), it was virtually a foregone conclusion that the dairy premium would follow suit and be merged with the SFP, thereby losing its identity as 'originating' in the dairy support programme.

Figure 4.8 sets out diagrammatically the operation of the most important trade measures as they apply to each dairy product. The first panel of the diagram shows the relationship between the entry price for products subject to the full Most Favoured Nation (MFN) tariff, the world price and the entry price for products imported within a TRQ. As depicted in Figure 4.8, it is effectively the size of the EU export subsidy that fixes the level of the EU domestic price (in other words, the export subsidy determines the effective price gap). Imports under the TRQ can enter at a rate of duty less than the subsidy, but are sold on the EU market at the full domestic price, with the 'quota rent' accruing to whoever is the holder of the licence to import under the TRQ.

This figure allows us to relax the 'small country' assumption, which was made for simplicity in section 4.2 above. A country is 'small' with respect to a particular commodity when its trade flows are too small relative to the world market to alter world market price. This is clearly not true in the case of the EU and world markets for dairy products. It can be seen (although it is not shown explicitly in Figure 4.8), that if the EU opted for a higher domestic price the following changes would ensue:

in the second panel – domestic market:

- EU domestic supply would increase,
- the amount of exportable surplus would increase.

in the third panel – world market:

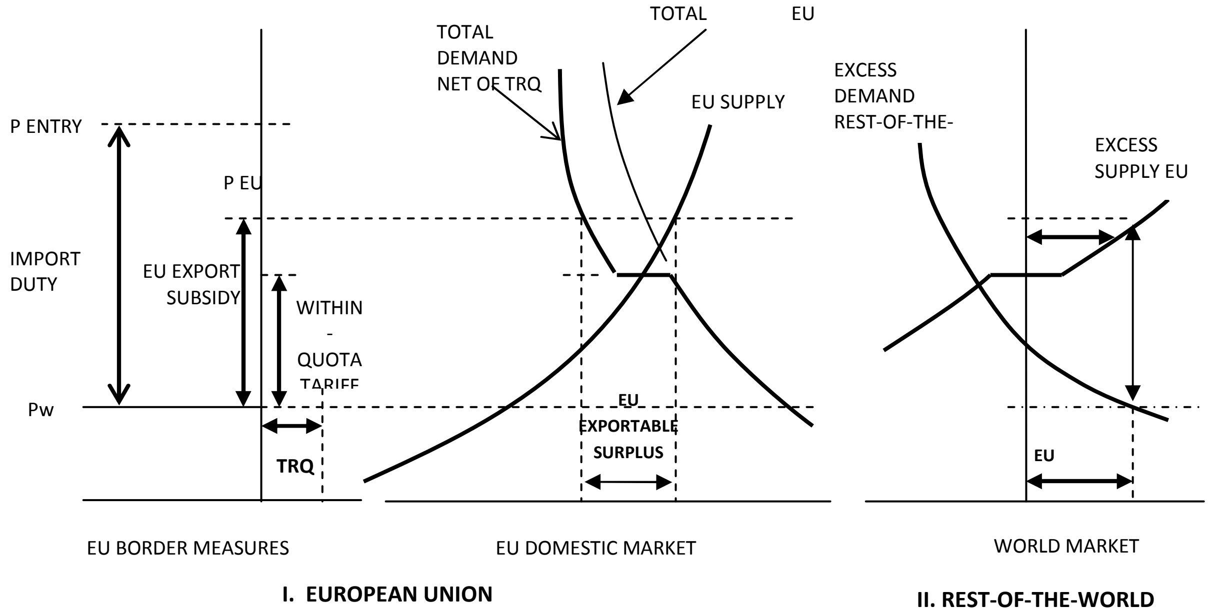
- the EU would move up its excess supply curve,
- world-market purchasers would move down their demand curve to absorb the higher export offer, and
- the EU export subsidy would have to increase to cover the larger price gap.

Note that the required adjustment of the export subsidy is already implicit in the second panel of the figure.

This reasoning demonstrates clearly how the EU's active use of the world market for surplus disposal in previous decades had the effect of driving down the price and worsening the demand conditions it faced in those world markets, to the benefit of net importing countries but to the cost of other dairy exporting countries. It also shows that the inability to continue subsidising exports beyond a given ceiling weakens control over the EU domestic price. Effectively, it constrains the marginal rate of export subsidy and hence forces the market managers, faced with an increase in exportable surplus when the ceiling is already reached, to allow the domestic market price to fall so that the increase is either absorbed by domestic demand or can be sold on the world market without subsidy.

Figure 4.8, as drawn, does not include EU quotas on domestic milk supply. If quota limits are added to the figure, their impact is the same as was set out in detail in Section 4.1: the exportable surplus is reduced, thereby reducing the number of units of export that have to be exported with subsidy, but without changing EU demand. However, Figure 4.8 also shows clearly that, when the exporting country is 'large', the world market price itself rises when the EU's exportable surplus falls and the rate of export subsidy needed to hold the domestic price level is reduced. Therefore, there is a two-fold downward impact on the cost of surplus disposal.

Figure 4.8 The EU domestic market and the world market, showing the operation of the main trade measures



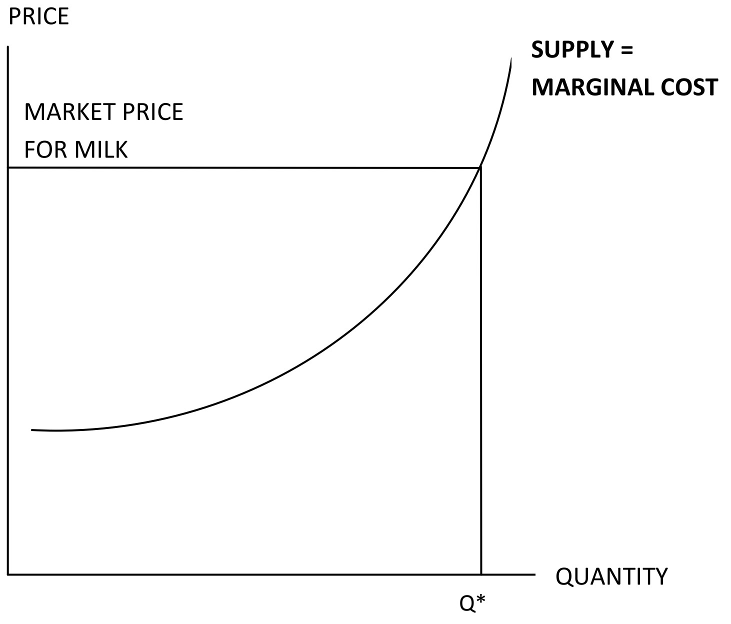
4.4 Dairy income and the decision to quit

This section analyses the micro-economics of the individual price-taking milk producing enterprise. In particular, it considers the link between price support and income, and attempts to shed light on the factors underlying the decision to quit milk production.

Figure 4.9 provides the basic framework for analysing these questions. The upward-sloping supply curve shows how much milk a producer would be willing to supply at each level of market price. For example, at the market price shown in the figure, the producer would be willing to supply the amount Q*.

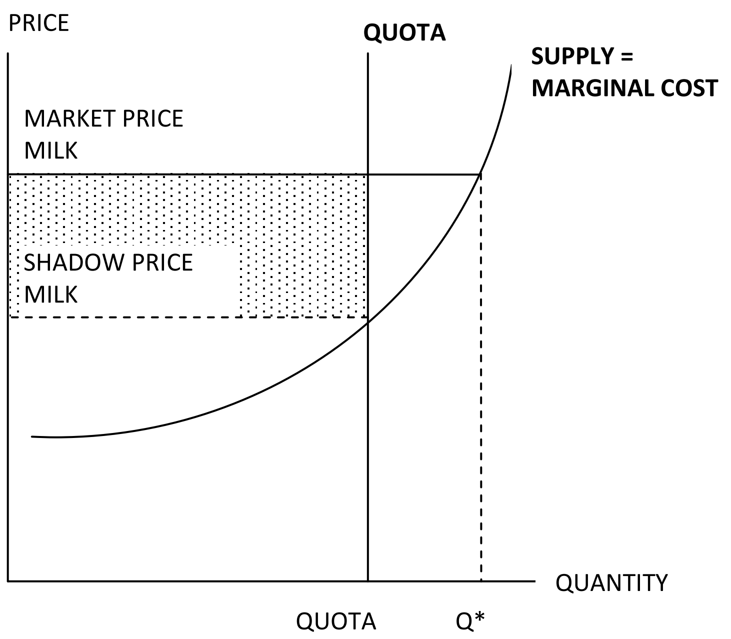
The supply curve also traces out the marginal cost of supplying the last unit of milk at each of these potential supply levels. It is clear that, at each level of supply, the full market price is needed to cover the extra cost of the last unit only. For all the intra-marginal units, the given level of price exceeds the marginal cost of producing them. The total area under the supply curve up to the output level Q* is interpreted as the sum of the marginal cost of producing all units, or in other words the total cost of the variable inputs used to produce Q*.

Figure 4.9 Economics of milk supply



When the market price is as shown in the figure, the producer's revenue is the rectangle PRICE $\times$ Q*. As only the part of the revenue that lies under the supply curve is needed to remunerate the variable inputs, the remainder – the area above the supply function but under the price line - is the income available to remunerate the fixed factors (permanent labour, land and other capital). More efficient producers, or producers with natural cost advantages like better grazing land or superior herd capital, will have lower intra-marginal variable costs, and hence supply curves that are lower for much of the range of output up to the final unit produced. Therefore, for these producers, there will be more revenue left after paying the variable factors to enable a higher remuneration of these better-performing fixed factors. Over time, the income-earning potential of fixed factors becomes built into their asset value – higher-earning land has a higher market value. Therefore, the income to fixed factors must not be equated with 'profit', which is what is left when *all* factors have been remunerated at their economic cost.

Figure 4.10 Milk supply and the impact of an individual quota



In Figure 4.10, a supply quota has been imposed, which prevents the producer from supplying his desired level of output, Q*. We assume the market price remains unchanged at the same (supported) level. The supply function shows that a much lower price incentive would have been sufficient to persuade the producer to supply only up to the quota level. This price is the so-called *shadow price of milk*. Yet he receives a much higher price. The difference between the market price and the shadow price is the (marginal) quota rent. The shaded area represents the total quota rent – the revenue that he receives for supplying the quota amount *over and above what he would have needed to receive* in order to supply (only) that amount voluntarily.

Under a quota scheme, the producer needs to be in possession of the right to supply his quota allocation. Without this right, he cannot supply. Therefore, it follows that the total quota rent can be interpreted as the economic return to the possession of the corresponding quantity of quota rights for one supply period, and the amount (MARKET PRICE FOR MILK – SHADOW PRICE) is the implicit value to him of a unit of quota for one supply period, at this level of quota. The asset value of the quota is the present value of the discounted flow of future quota rents, with the rate of tie discounting reflecting uncertainties about the duration of the quota scheme and about future decisions relating to the support price.

If quota can be leased, it would be advantageous for the producer to lease out some of his quota as long as the leasing price is greater than his own marginal quota rent. Leasing out, and hence moving back down his supply curve, would increase his quota rent at the margin until it comes into line with the market leasing price. Alternatively, he would lease in more quota if the leasing price is less than the quota rent that he could earn on units of output beyond his current quota limit. When permanent sales of quota are possible, the same reasoning applies: the producer will in theory be a quota purchaser if the quota price is less than the discounted present sum of the future quota rent he can earn on extra units, or in the opposite case, he will be a quota seller.

In the real world, many other factors influence the quota transfer decision. For example, a potential purchaser may face a borrowing constraint that makes it impossible for him to enter the market, the herd may be just one of the enterprises on the farm and may be in balance with the logistics of the whole farm at its present size, or there may be non-pecuniary (psychological or subjective) reasons for not wanting to expand or downsize. Furthermore, it has to be recognized that milk is not the only marketable output of a dairy herd – calves and culled cows also provide income and this may influence production decisions.

Two further remarks should be made. First, it cannot be assumed that the amount identified in Figure 4.9 as the remuneration of the fixed factors is automatically part of the producer’s own income. If he owns all this fixed factors, then it *does* form part of his income but not his income as a farm operator. It is in fact income accruing to his asset ownership. For example, the part of this payment that represents the return to land is his income as a landowner rather than as a milk producer. It follows that if he does not own his land (for example, he is a tenant or the bank loan used to buy the land has not yet been paid off), the corresponding part of the fixed factor income is paid out by him to the owner of the corresponding asset, and he is left with the part of the fixed factor income that corresponds to his own assets (managerial skill, herd capital or whatever).

The same reasoning applies to the final destination of the quota rent. If the producer owns the quota, quota rent remains part of his farm income (but strictly speaking because of asset ownership rather than his production activity). However, if he has borrowed to buy the quota and is paying interest on his loan, the quota rent will be paid out in interest to the lender.

Figure 4.11 Economics of quota transfer

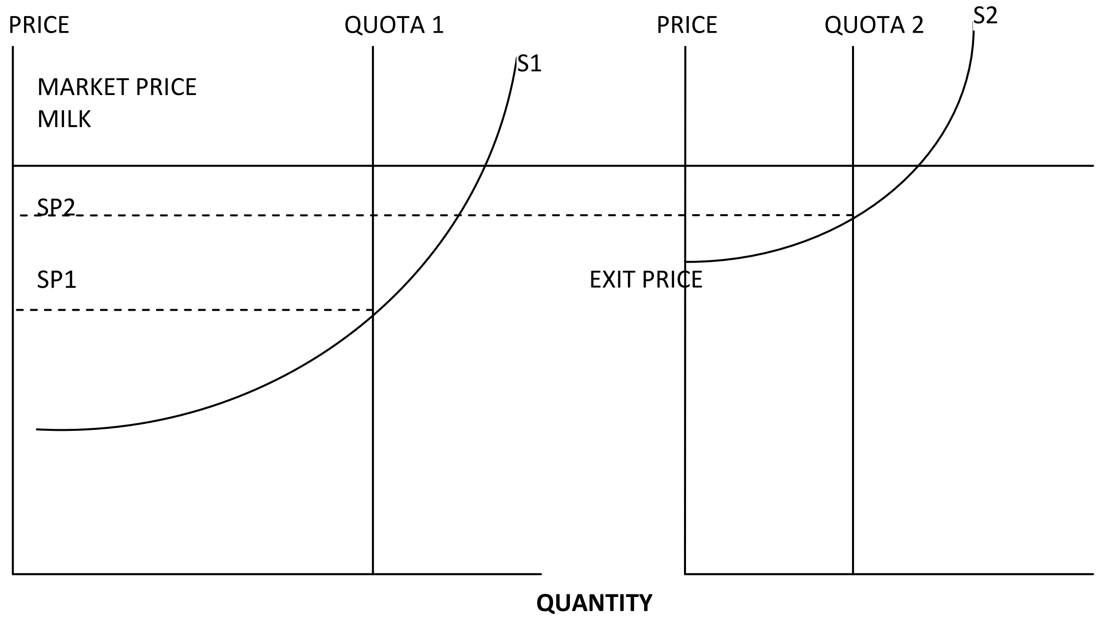


Figure 4.11 compares the situation of two different milk enterprises, the first being characterized by a greater level of efficiency, and a higher level of quota, than the second. The efficiency differential is reflected in the very different levels of the two shadow prices. With the current milk price and their given level of quota, both are able to stay in production.

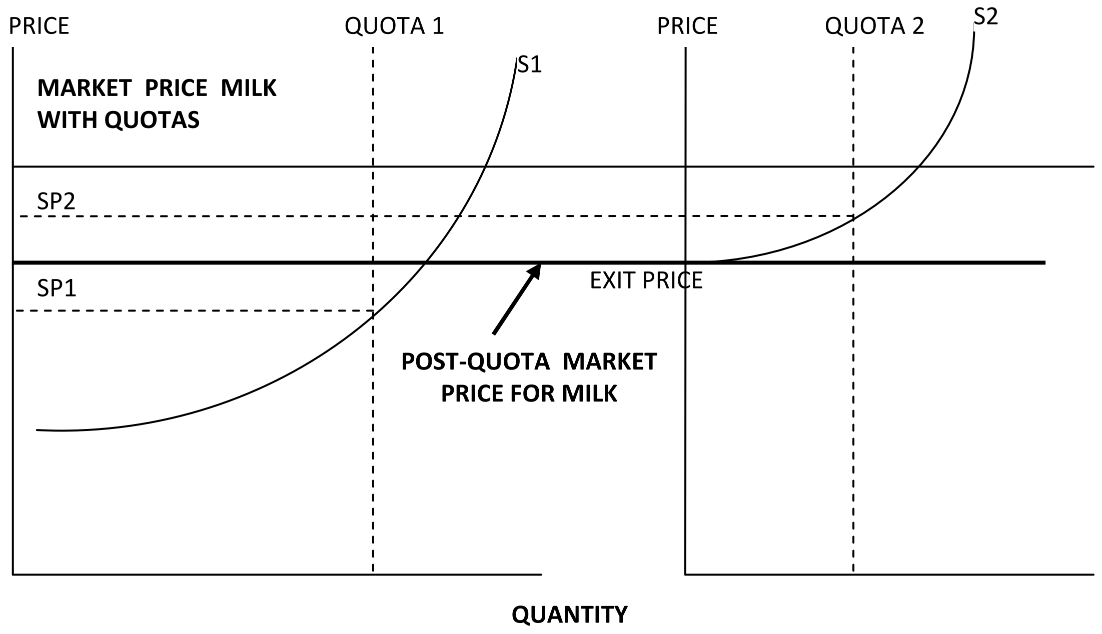
If they are able to trade quota, producer 1 would be willing to buy quota at prices less than the capitalized equivalent of PRICE – SP1, and producer 2 would be willing to sell at prices above the equivalent of PRICE – SP2. Therefore, a transaction could be agreed between them for a price somewhere in the range: PRICE – SP2 < QUOTA PRICE < PRICE – SP1. Indeed, producer 2 would sell his entire quota for a price in excess of (the capitalized equivalent of) PRICE – EXIT PRICE. But even at this price, which is feasible for producer 1 at the margin, the *entire* quota would not be bought by producer 1, because only a smaller number of units of output beyond his quota level can earn quota rent in excess of this amount.

The above analysis does not explicitly allow for differences in the opportunity cost of fixed factors between farms in different locations and situations. In cases where there is no other economic use for the fixed factors (land and/or labour) apart from milk production, producer 2 would resist profitable quota trades as long as this enabled his fixed factors to continue to earn some income (over and above variable costs).[28]

Finally, we consider what would happen if quotas are abolished and the market price for milk falls to the level denoted in the figure as POST-QUOTA MARKET PRICE (Figure 4.12). In this case, producer 1 remains in milk production and expands output beyond his old quota level, whereas producer 2 cannot cover his variable costs and ceases production. Under this scenario, producer 2 does not receive any exit payment. It is therefore a possibility that, *before* quota is abolished and while it still has some marketable value, producer 2 might sell his entire quota for less than PRICE – EXIT PRICE if he expected to no longer be able to survive in the post-quota environment. At least in this way he would realize some capital on his quota holding.

[28] A consequence of this analysis is that the aggregate supply curve might shift down as compared to a situation where quotas are not tradable. See Réquillart *et al.* (2008) for further details.

Figure 4.12 Quota abolition and the decision to quit



The above analysis attempts to shed some light on the dynamics of structural change (herd size changes and exits from milk production[29]) under a quota scheme. In this simple example, we see that:

- the regime characterized by a high support price for milk plus quotas enables producer 2 to remain in milk production, which thereby prevents more quota becoming available for use by more efficient producers and hence slows down their expansion, whereas when quotas are abolished he exits
- expectations of much lower prices post-quota may incite him to anticipate his exit by a few years in the hope of realizing some of the (rapidly diminishing) value of his quota
- under tradable quotas some structural dynamics are still possible, and the fact that the asset value of quota can be realized may actually speed up the decision of some producers to leave the sector.

A recent paper has compared herd-size dynamics in the pre-quota (pre-1984) and quota (post-1984) periods in Germany and the Netherlands (Hüttel and Jongeneel, 2011). The main findings are that, overall, shifts between size classes and shifts towards larger size classes were greater in the quota period than in the pre-quota period, although mobility out of milk production was lower. This result might suggest that EU milk quotas have not 'stifled' structural change in these two countries, as was initially predicted, but they may have retarded the rate of (average) efficiency improvement (if they allowed less efficient herds that would otherwise have ceased to remain in production).

Of course, the pre-quota period cannot be treated as a true counterfactual for the quota period, as many other features of the farming and policy environment differed between the two periods. Moreover, the authors rightly conclude that the results for these two policy regimes cannot provide robust predictions about what the overall structural evolution of the sector might be in the post-quota period.

[29] The structure of the sector is usually described in terms of the number of herds and their size, measured by the number of cows. This is an indication of *milk-producing capacity*. If these parameters change, *other things being held constant*, then the milk output of the sector changes. However, the link between these parameters and the quantity of milk produced is not fixed, as (in the short term) a given number of cows can be induced to yield more milk if more intensive management techniques are used (in particular, higher feeding rates) and in the longer term, herds can be converted to higher-yielding breeds).

5 EQ1: Production and supply to / demand from dairies

Raw milk production represents the first stage of the dairy supply chain (see section 4.2). It is used by all the other parts of the chain and hence is affected indirectly by all factors that affect one or another part of the supply chain. The evaluation of the impact of CAP measures on raw milk production and supply takes into account policies that targeted raw milk production directly (for example, expansion of production quotas for milk deliveries) but also policies that were directed to other downstream segments of the supply chain.

A. EQ1a: Production and supply to / demand from dairies (market balance)

To what extent have the CAP measures applicable to the dairy sector contributed to balancing supply and demand for milk?

5.1 Interpretation and comprehension of the key terms of the EQ1a

The key terms in this evaluation question are supply, demand and balance. We interpret supply as milk that leaves the farm, that is milk production minus on-farm use and losses, which is equivalent to the sum of the volumes delivered to dairies and sold directly off farms. The demand for milk is a derived demand – it depends on the demand for the dairy products that has been obtained from the milk and is properly assessed at the moment where it is demanded by an end-user – the final consumer. We interpret 'demand for milk' as the demand for the final consumption of milk as embodied in all its derived products, and at the point where it becomes final domestic consumption or export use.

In a managed market, balance can be defined in different ways, which require careful definition. 'Structural balance' holds when the quantity supplied is matched by the amounts demanded for final use by consumers and export markets without any policy measures being required to stimulate or create this demand. Clearly, the concept of an absolute level of structural balance has no sense, since both sides of the balance are responsive to price. In the case of the EU market for milk, as long as the quantity supplied is – more or less - fixed by quota and imports under TRQs, and if prices are not perfectly free to adjust to clear markets without government assistance, then it is quite possible to have a structural imbalance, leading to a *structural excess supply*.

A second concept of balance, market balance, is achieved when no aids to final demand *and* no policy-managed stocking or de-stocking are needed to maintain an acceptable price level in the short term. The *market surplus* is defined as the structural surplus plus the net change in stocks used for the purpose of smoothing prices. Stock changes temporarily remove or re-supply products from and to the market so that it balances at a more stable price than would otherwise be the case, but they are not part of final demand. Over a period of years, the underlying trends in structural excess supply and market surplus are the same.

The analysis below focuses on the concepts of structural balance and structural excess supply. Their exact definitions are given in the following section.

5.2 Methodology used for answering EQ1a: market balance

As explained in Chapter 4, balance between supply and demand is established more or less automatically in a market with perfect competition where prices and quantities are free to adjust. However, if prices and quantities are not free to adjust, then imbalances are very likely to occur.

Structural balance for EU raw milk is given by equation (1):

Structural balance occurs when
EU domestic supply + imports = unsubsidised EU consumption + unsubsidised exports (1)

Total supply onto the EU market on the left-hand side of equation (1) depends on policy measures affecting the domestic supply of milk (or its constituents) such as the milk quota ceiling, while imports also depend on trade policies (see also discussion in the Theoretical analysis, Chapter 1). Although there is hardly any trade in raw milk, all processed dairy products are traded on international markets.

Without demand management policies, total supply has to be absorbed spontaneously by final demand outlets. This occurs if the pressure of supply is allowed to drive prices down, thereby inducing an increase in demand (and/or a decrease in supply if supply is not fixed), until demand absorbs the supply that is offered.[30] Given the current milk-producing capacity in the EU and current demand levels, achieving structural balance without changing the left-hand side of (1) would mean a substantial lowering of the level of market price.[31] If this is considered to be unacceptable, policy measures can be used that boost the demand side of (1).

CAP policies to increase market off-take influence various segments of dairy demand. They are:

- domestic consumption aid programmes for dairy products (for example, disposal aid for butter, school milk programme[32])
- subsidies on exports

All these measures play a role in determining the structural excess supply of milk. This is summarised in equation (2):

Structural excess supply = subsidised EU consumption + subsidised exports (2)

In addition, some CAP measures withhold products from the market temporarily, namely

- net intervention (public) stocks and subsidised private storage

Market surplus = subsidised EU consumption + subsidised exports + net changes in public and subsidised private stocks (3)

[30] This is a medium-term concept, since the first three terms are fairly stable over time. Demand for unsubsidised exports may be more variable, given exchange rate variations and so on. Therefore, a public stockholding facility that buys on the domestic market if price dips and sells when it is restored, may be used to smooth fluctuations in domestic price. The use of such a mechanism is compatible with medium-term structural *balance* as long as the average level of stocks is constant over the medium term (and net stock changes average to zero in the medium term.

[31] This statement assumes that demand conditions (on EU and world markets) remain unchanged. During 2007-2008 world market demand temporarily increased dramatically, forcing up the world market price and the EU price also, so that even with higher prices the structural excess supply fell. In the longer term, with population growth and hence growing internal demand, reducing the structural surplus can be achieved without lowering prices as much as with no internal demand growth. In both these example, the price increase is demand-led.

[32] The school milk programme is not under evaluation in this report.

The supply of milk enters the market by two routes: as deliveries to dairies and as direct sales of milk and farm-processed products by milk producers to final consumers. The quantity of milk delivered to dairies depends in the medium term on how much milk the dairies can sell on into the markets for dairy products. Aided consumption schemes and subsidised exports target the markets for dairy products from the processing industry. The rationale for these schemes is that by supporting the markets for dairy products, support will be passed back up the chain to milk producers. Direct sales markets are local and are often niche markets. Milk that is commercialised via direct sales is also subject to quota. Apart from this, there is no policy intervention in direct sales markets.

Raw milk is composed of three main elements: fat, protein and other non-fat solid components. Processing milk products from raw milk can be interpreted as transforming fat, protein and non-fat solids components into new products with a specific fat, protein and non-fat solids composition (e.g. cheese, butter, SMP).

Since these three components are the valuable parts of the milk, and the ingredients whose attributes are demanded by consumers, the balances for each of them separately are examined separately.

The aggregate supply of the fat, protein and other non-fat solids for raw milk in the EU is given by equation (4):

$$S_s = \sum_i a_{i,s} S_i \qquad (4)$$

where S_s : the aggregate EU supply of milk constituent s (s = fat, protein, other non-fat solids)

S_i : the raw milk supply in MS i

$a_{i,s}$: amount of constituent s per unit of raw milk produced by MS i.

The fat, protein and other non-fat solids components of subsidised consumption and subsidised exports for butter and cheese are calculated in an analogous way. For example, the fat component of subsidised butter in the EU is calculated as:

$$B_f = \sum_i b_{i,f} B_i \qquad (5)$$

where B_f : total fat content of subsidised butter

B_i : subsidised butter in MS i

$b_{i,f}$: amount of fat per unit of subsidised butter produced by MS i.

These calculations require the following data:

- milk supply in the EU (deliveries to dairies and direct sales of drinking milk)
- the composition of raw milk in terms of fat, protein and other solids
- the composition of each of the processed dairy products in terms of fat, protein and other solids
- the quantities of aided consumption, subsidised exports and net changes in intervention and subsidised private stocks of each dairy product.

Once the structural excess supply of all components (fat, protein, other non-fat solids) have been calculated, they can be converted to a raw milk equivalent. To do this, the total solids method is followed (IDF, 2004). It involves adding the calculated amounts of these three components together to obtain total solids, which is converted into raw milk equivalent by multiplication by the factor 7.874[33] (IDF, 2004).

[33] 7.874 is according to IDF (2004) the reciprocal value of 12.7% solids content of whole milk at 3.7% fat, 3.2% protein and 5.5% other solids

5.3 Judgement criteria, indicators and information sources used for each indicator

The indicators and information sources used to answer the questions concerning supply, demand and market balance are provided in Table 5.1.

Table 5.1 Indicators, data requirements and information sources for EQ1a

Indicator	Data requirement	Information sources
Milk production, supply	Data on raw milk production and supply, fat content, protein content	Eurostat, EU Commission, ZMP, and national statistics
Structural excess supply for fat, protein and other solids	Quantities of subsidised domestic consumption and subsidised exports by product	Eurostat, COMTRADE, European Commission
Structural excess supply for milk equivalent	Estimates for milk constituent coefficients per unit of milk products for fat and protein	Technical information from dairy processing experts in order to recover milk-component coefficients

The judgement criteria involve verifying whether trends in the indicators remain constant throughout the period, or whether these trends alter in the post-2003 period in line with expectations as set out in the Intervention Logic and summarised below.

The 2003 dairy policy reform included the following changes, starting in mid-2004:

- Shift of income support from price to direct payment (dairy premium, subsequently decoupled from milk),
- Reduction in intervention prices for butter and skim milk powder,
- Abolition of target price for milk.

These policy changes are expected to lower the market price for milk in the period starting in 2004/5, which should affect components of structural excess supply as follows:

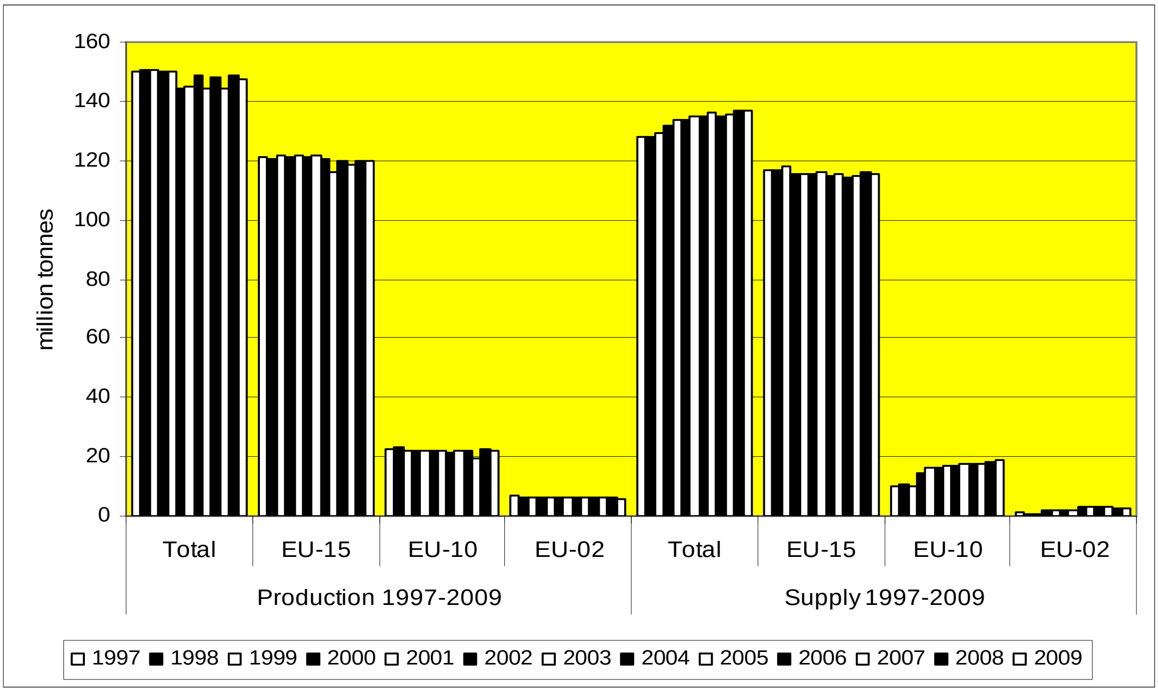
- Increase in unsubsidised internal demand
- Smaller price gap between domestic and world market prices, making it easier to export without subsidy (or to export with a lower rate of subsidy).

Both these impacts would contribute to reducing structural excess supply. Therefore, the main judgement criterion is whether these expectations are borne out by the calculated market balances.

The market turbulence experienced during the period 2007-2009 caused EU and world market prices to rise, thereby masking the impacts of the policy changes agreed in 2003. It follows that the most reliable evidence on the *ceteris paribus* impact of the policy changes is provided by what happened in 2004-2006, although the data for the following years offer interesting insights into the impacts of a sudden increase in world market demand on the EU milk sector. It should be noted that the increase of 2% in milk quota in April 2008 (Regulation (EC) 248/2008) was in response to the increased worldwide demand for milk products, which could have reduced the EU's structural excess to zero and caused even higher internal prices than those that occurred.

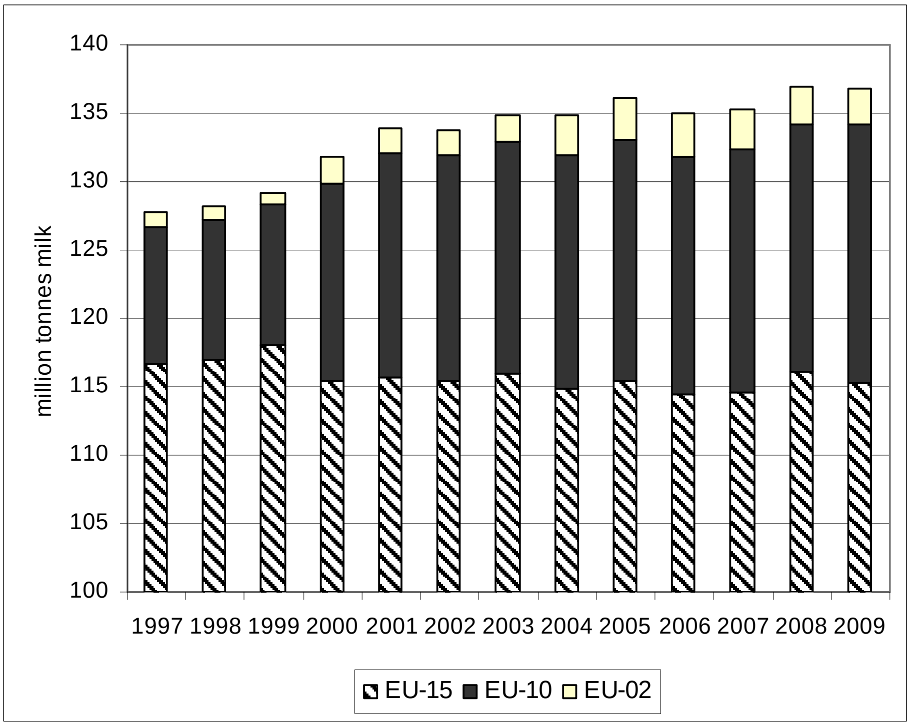
5.4 Milk supply

Figure 5.1 Milk production and supply in EU-15, EU-10 and EU-02, 1997-2009



Source: Eurostat.

Figure 5.2 Total milk supply (deliveries to dairies + direct sales), 1997-2009



Source: Eurostat.

Figure 5.1 shows the evolution of domestic milk production and supply in the different parts of the EU. It should be borne in mind when interpreting the amounts shown as 'total' (the sum of quantities over the three country groups) that the countries of EU-10 entered the Union only in 2004 and those of EU-02 in 2007. Their participation in the CAP dates from the year of their accession, and prior to their entry their production and supply were not part of the respective EU totals. The figures for their production and supply are shown for the entire period in order to provide a perspective.

From 2004 onwards, EU-15 production and supply were on average about 2.2 million tonnes and 1.2 million tonnes lower, respectively, than in the 7-year period before 2004. The increasing supply of the accession countries from 1997 onwards is due to the decline in subsistence milk production and the increasing integration of milk production in these countries into organised supply chains.

Figure 5.2 presents figures on supply using the same conventions as adopted for Figure 5.1. Again, the 'effective' EU domestic supply up to the end of 2003 is that of EU-15, then there is an upward step as EU-10 production is included from 2004 onwards, and finally for 2007-2009, EU supply is given by the full height of the vertical bar.

Only the countries of EU-15 were regulated by the CAP for the entire period, and therefore the evolution of their supply contains the most information about the impacts of dairy policy changes. Their evidence also contains less 'noise' from other factors than the data for EU-10 and EU-02, which were undergoing adjustment to EU membership in the first years after their accession.

EU-15 milk supply peaked in 1999 (at just over 118 million tonnes), and was stable at 115-116 million tonnes over the next five years. Supply was below 115 million tonnes in 2006 and 2007. The question is whether this is a lagged reaction to the lower price level for milk already recorded in 2005 and persisting in 2006 (see evaluation question 2)[34], or the combined effect of a short-run response to price plus longer-run adjustments (herd closures, etc.) due to decoupling of the dairy premium and uncertainty about the future of the quota scheme. A rigorous statistical analysis would be needed to determine the relative importance of each of these policy-induced changes were as drivers of this behaviour. However, in the absence of other explanations, we conclude that the lower EU-15 supply levels after 2003 and up to 2007 resulted from the package of policy measures implemented after 2003. Lower EU-15 supply during this period does not show up in the total supply for EU-27 because of an increase (+800 thousand tonnes) in EU-10 supply.

The 2% quota increase in 2008 and the non-policy-related price spike of 2008 meant that EU-15 supply was more than 1 million tonnes higher in 2008 than in the previous two years (Table 5.2). This masks the continuing effect of the 2003 policy changes. It should be borne in mind that, starting in 2004, the global EU milk quota was not met and that by 2009, total supply was about 10 million tonnes below the EU ceiling (although five Member States were above their national ceilings).

Table 5.2 Summary of EU milk supply, averages in different sub-periods

	1997-1999	2000-2002	2003	2004-2007	2008	2009
EU-15	117.18	115.50	116.01	114.93	116.13	115.32
EU-10	10.22	15.78	16.89	17.44	18.04	18.80
EU-02	0.97	1.88	1.90	3.00	2.81	2.69

Source: Eurostat.

The evidence shows that milk supply is responsive to policy signals, and that as quota limits cease to be constraining, producers' strategies will depend increasingly on rather than on what is permitted by quota limits, indicating greater market orientation.

[34] Although market price falls were 'compensated' by the dairy premium (calculated as a function of quota currently held) and then the decoupled payment (unrelated to current milk production) in these years, these direct income payments did not depend on the amount of *milk produced*, which therefore reacted to the price signal alone.

5.5 Structural excess supply and market surplus for fat, protein and other non-fat solids

Table 5.3 presents the structural excess supply in terms of fat, protein and other non-fat solid components and in raw milk equivalent.

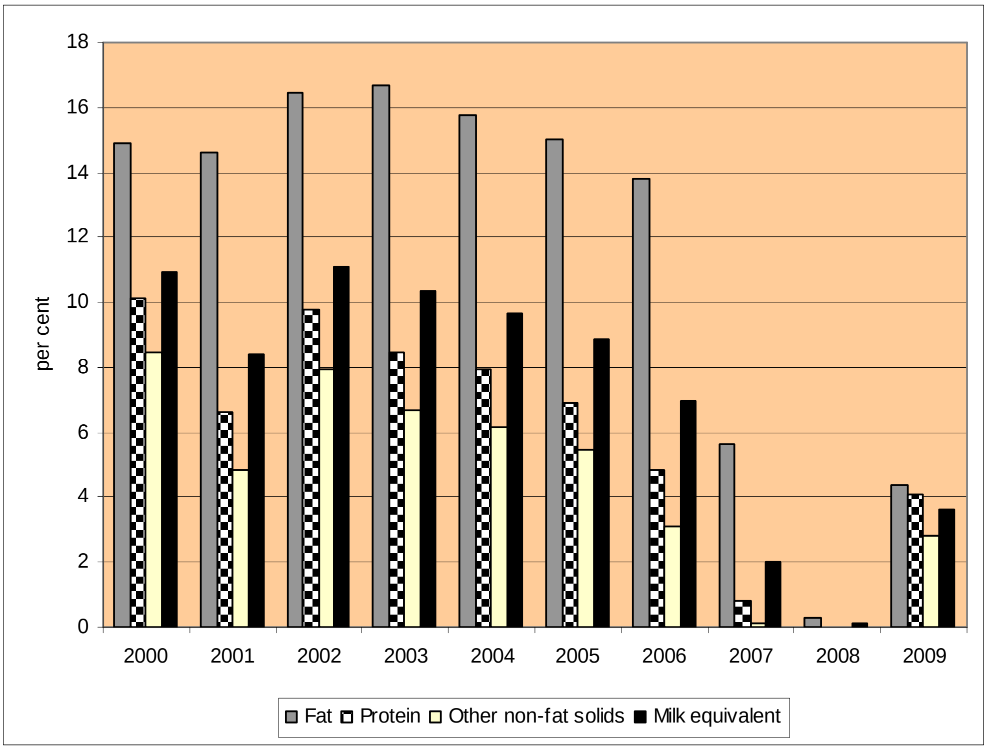
Table 5.3 Market and structural excess supply for the milk components and milk equivalents, EU-15/25/27, 2000-2009, 1,000 t

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Fat										
Domestic supply	4,700	4,725	4,692	4,716	5,367	5,390	5,334	5,462	5,531	5,521
Imports	125	140	137	140	105	94	101	100	75	73
Aided consumption	453	465	449	452	470	469	458	172	15	10
Subsidised exports	266	246	344	359	391	356	292	140	1	233
Net change in stocks										
Public (intervention)	6	4	105	26	-53	-34	-47	-53	0	67
Private, aided by EU	-6	15	-21	-1	-3	-1	-11	13	-10	-9
Market surplus	719	730	877	836	804	790	692	272	6	301
Structural excess supply (SES)	719	711	793	811	861	824	750	312	16	243
SES as % of total supply	14.9	14.6	16.4	16.7	15.7	15.0	13.8	5.6	0.3	4.4
Protein										
Domestic supply	7	3,875	3,868	3,893	4,432	4,455	4,405	4,541	4,605	4,596
Imports	115	115	116	125	85	68	78	69	57	59
Aided consumption	182	128	170	161	161	138	102	2	0	0
Subsidised exports	219	136	219	179	197	174	115	34	1	190
Net change in stocks										
Public (intervention)	-64	-2	54	20	-49	-24	-1	-1	0	94
Private, aided by EU	0	0	0	0	0	0	0	0	0	0
Market surplus	337	262	444	360	308	289	215	36	1	284
Structural excess supply (SES)	401	264	390	340	357	313	216	36	1	191
SES as % of total supply	10.1	6.6	9.8	8.5	7.9	6.9	4.8	0.8	0.0	4.1
Other non-fat solids										
Domestic supply	6,345	6,366	6,347	6,381	7,258	7,316	7,253	7,439	7,534	7,525
Imports	54	42	51	67	21	8	16	10	8	6
Aided consumption	299	205	274	268	260	228	166	0	0	0
Subsidised exports	241	104	233	163	190	172	59	9	1	213
Net change in stocks										
Public (intervention)	-109	-4	89	33	-81	-41	0	0	0	162
Private, aided by EU	0	0	0	0	0	0	0	0	0	0
Market surplus	432	305	596	465	369	359	226	9	1	375
Structural excess supply (SES)	541	309	507	431	450	400	226	10	1	213
SES as % of total supply	8.4	4.8	7.9	6.7	6.2	5.5	3.1	0.1	0.0	2.8
Milk equivalent										
Domestic supply	117,329	117,846	117,368	118,029	134,306	135,122	133,791	137,335	139,135	138,912
Imports	2,313	2,343	2,401	2,616	1,667	1,347	1,538	1,412	1,101	1,085
Aided consumption	7,359	6,284	7,037	6,938	7,018	6,574	5,714	1,375	120	81
Subsidised exports	5,719	3,827	6,273	5,518	6,117	5,529	3,669	1,440	19	5,015
Net change in stocks										
Public (intervention)	-1,312	-25	1,950	625	-1,446	-774	-378	-423	0	2,539
Private, aided by EU	-47	122	-168	-7	-27	-7	-85	107	-80	-74
Market surplus	11,719	10,208	15,091	13,074	11,662	11,322	8,920	2,499	59	7,561
Structural excess supply (SES)	13,078	10,111	13,310	12,456	13,135	12,102	9,383	2,815	139	5,096
SES as % of total supply	10.9	8.4	11.1	10.3	9.7	8.9	6.9	2.0	0.1	3.6

Notes: 1) For 2000-2003: EU-15, for 2004-2006: EU-25, and for 2007-2009: EU-27. 2) The data used for the calculations are presented in Table 2.49 for the disposal aid of butter, Figure 2.8 for the closing (public) intervention stocks. The change in private stocks aided by the EU for butter and SMP are taken from DG AGRI (various years). The subsidised exports refer to calendar years (DG AGRI, unpublished). The fat and protein composition of those products is taken from Eurostat. The non-fat solid composition is taken from IDF (2004).

Table 5.3 shows that the structural excess supply was positive in all years between 2000 and 2009 both in milk equivalent and for fat, protein and other non-fat solids. Thus, given the level of policy-maintained price support, the EU was producing more milk, and more of all the main milk components, than the domestic and world market could absorb without the use of subsidies. The milk equivalent structural excess supply peaked in 2002, but by 2004-2005 it was back at its 2000 level of between 8 and 9 million tonnes. In 2006, structural excess supply of milk equivalent was lower than it had been since the beginning of the decade, in 2007 it stood at less than 2 million tonnes, and was just 60 thousand tonnes in 2008. Despite a considerable rise in 2009, this was the second-lowest level of the structural excess supply in milk equivalent of the ten years shown. The changes after 2006 were primarily because of changes in the structural excess supply of fat, and this was because of the higher unsubsidised consumption and unsubsidised exports of butter.

Figure 5.3 Structural excess supply of fat, protein, other non-fat solids and milk-equivalent as % of total supply, 2000-2009



Source: see footnote to Table 5.3.

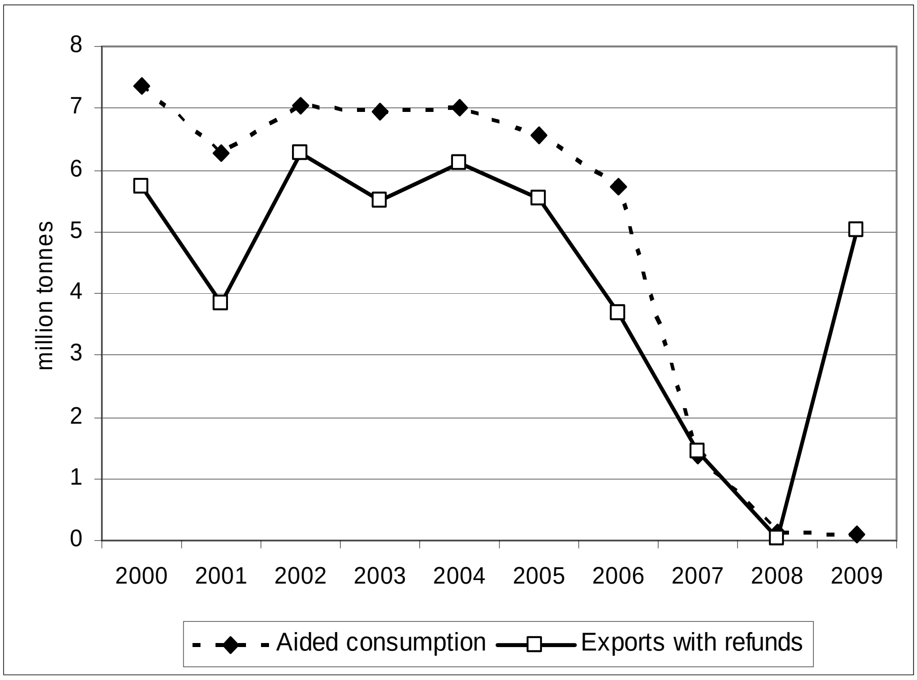
Figure 5.3 emphasises that, relative to a situation of structural balance, fat is the milk component whose structural excess supply relative to total supply was the greatest for most of the period. Its highest value occurred in 2002, at over 16% of total supply. Other non-fat solids had consistently the smallest excess structural supply relative to a situation of balance throughout the period. It is stressed that structural excess supply must not be interpreted as showing an excess over self-sufficiency levels. Rather, they reflect the excess over what the domestic *and international* markets can absorb without the use of disposal measures.

Up to 2006, aid to domestic consumption was used to dispose of larger quantities of the excess supply than export refunds, and its year to year use was more stable than that of export refunds (Figure 5.4). Use of both these measures was at historically very low levels in 2007 and 2008, whereas in 2009 aid to domestic consumption remained low (only 81 thousand tonnes of milk equivalent)[35], whereas export refunds were again quite extensively used (5 million tonnes of milk equivalent). Evidence presented in evaluation question 2 shows that in 2007 and 2008 the world milk price equivalent (WMPE) (calculated on the basis of world market prices for butter and SMP) was higher than the EU's intervention milk price equivalent (IMPE). Therefore, export refunds on butter and SMP were suspended, since to pay them

[35] Disposal aid for butter and cream for use in manufacturing and for direct consumption was abolished in the Health Check (Regulation (EC) 72/2009).

would have involved support above the intervention price level, which is the intended floor price. However, when the WMPE dipped below the IMPE in 2009, the option to resume export refunds re-emerged.

Figure 5.4 Milk equivalent disposed of with domestic consumption aids and export subsidies, 2000-2009



Source: See note to Table 5.3.

5.6 Conclusions

Despite the continuation of the quota scheme throughout the period, domestic supply became more responsive to price signals after the policy changes decided in 2003. Rather than national quotas always being filled or over-filled as in the past, there was an increasing tendency for some Member States not to reach the national quota ceiling as individual producers made more market oriented decisions and made use of the greater freedom of choice due to decoupling of the dairy premium. National ceilings were increased across the EU by 2% on 1 April 2008, in response to the surge in world market demand and prices in 2007. The quota increase gave producers room to react to the higher prices, and meant that EU-15 supply was more than 1 million tonnes higher in 2008 than in the previous two years. The collapse of milk prices during 2008 and the first part of 2009 caused EU-15 supply to fall back in 2009, although very little of the fall was transmitted to the behaviour of EU-27 supply because of an increase (+800 thousand tonnes) in EU-10 supply (because an increasing share of production was supplied commercially). This evidence indicates that milk supply has become more responsive to price signals, and that as quota limits become less constraining, producers' strategies will depend on price as well as on what is permitted by quota limits. The combination of instruments and policy changes driving this development are: decoupling of the dairy premium, increase in quota, and lower intervention prices together with the abolition of the target price.

The structural excess supplies of milk fat, protein, and other non-fat solids, as well as that of milk equivalent, were positive throughout the period. Because of a temporary surge in world market demand, these excess supplies fell sharply after 2006, almost reaching zero in 2008, but became positive again in 2009.

Regarding particular policy measures, three elements of the 2003 reform package – the shift of income support from market price support to direct payment (dairy premium, subsequently decoupled from milk), the reduction in intervention prices for butter and skim milk powder, and the abolition of target price for milk – reduced the market price for milk and led to a lower structural excess supply at the intended market price level in 2005-2006. This was the impact intended by the policy changes, and can be attributed to them.

In 2007-2008, world market demand surged. The consequences were that, at first, maintaining internal price levels resulted in a much smaller structural excess supply, and in the latter part of this episode, when EU structural excess supply was almost zero, internal prices rose in response to rising domestic prices and the 2% quota expansion. However, the movement in structural excess supply during 2007-2009 was driven by external market forces, *not* EU policy changes, and should not be attributed to the 2003 reform package.

During 2000-2009, the structural excess supply was managed by domestic consumption aids and export refunds. Therefore, the use of these policy measures follows very closely the evolution of the structural excess supply. The use of these measures fell during 2005-2008, and rose again in 2009. Following the above reasoning, the trend in the use of these measures during 2005-2006 can be attributed to the 2003 policy reforms, whereas during 2007-2008 it was the result of world market-induced developments. In addition to these measures, public and private stockholding played a minor role in managing the market surplus.

Summary of findings for each indicator, EQ1a

Indicator	Expected result	Evidence found
Milk production, supply	Decoupling of the dairy premium, increase in quota, lower intervention prices and abolition of the target price would make supply more responsive to price signals. National quotas may not always be filled.	The expected effects were observed, earlier in some Member States than others, becoming generally visible by 2008-2009.
Structural excess supply (SES) for fat, protein and other non-fat solids	SES was expected to fall for all three milk components. Since the fall in the butter intervention price was greater than that for SMP, the SES for fat may fall relatively more.	The expected effects were found, starting in 2004. The SES of all components reacted with similar declines. It was not possible to observe the continuation of this process while holding other things constant, due to the disruption to markets in 2007-2009.
Structural excess supply for milk equivalent	SES for milk equivalent was expected to fall.	The expected effects were found, starting in 2004. It was not possible to observe the continuation of this process while holding other things constant, due to the disruption to markets in 2007-2009.

B. EQ1b: Production and supply to / demand by dairies (structural change)

To what extent have the CAP measures applicable to the dairy sector led to production restructuring?

5.7 Interpretation and comprehension of key terms of EQ1b

The 'structure of milk production' has various dimensions: (a) the way total milk output is allocated over herds of different sizes, (b) the breakdown of herds according to whether they are located on farms that specialise in milk production or on farms with a more diverse portfolio of production activities, and the share of total milk output that comes from specialist dairy farms (c) the geographical distribution of herds and milk output across the EU by Member State, and (d) the geographical distribution and extent of regional concentration of herds and milk production within Member States. This evaluation question examines whether any of these dimensions of production structure has changed as a result of the policy changes under review. The following paragraphs briefly review the reasons why these aspects of production structure are relevant to policy objectives, and to the performance of the dairy sector.

Herd size and economies of scale

It is well documented in the empirical economics literature that there are significant economies of scale (declining unit production cost) in EU milk production up to herd sizes of 60-80 cows.[36] To a large extent, this is due to higher output per unit of fixed labour and, to a lesser extent, fixed capital. Thereafter, with further scale expansion, unit costs fall much more slowly, then remain constant and – depending on the study – may eventually start to rise very slowly.[37] Therefore, structural change that leads to fewer, larger herds and hence to a larger share of sectoral milk output being produced by these larger herds lowers the average production cost across the sector, and improves its general economic performance. There is a broad consensus that this process is slowed down by farm-level milk quotas when farms have to obtain additional quota to expand (see, Rasmussen and Nielsen, 1985; Hennessy, 1995). A sectoral quota ceiling means that individual farm growth is possible only if some farmers quit milk production thereby freeing quota that permits other active dairy farms to grow (see Hüttel and Jongeneel, 2011).

As well as policy constraints, expansion can be limited by investment constraints. Generally, higher dairy profit and a low-risk outlook for dairying facilitate herd expansion.

Specialist and non-specialist milk production

A 'specialist dairy farm' is defined in the EU Farm Typology Classification System as one for which two thirds or more of the standard gross margins comes from the dairy activity. These farms generally devote the greater part of their agricultural area to feed and fodder crops for the dairy enterprise, and/or to grazing pasture. Management expertise is concentrated in milk production, which is also more likely to be the priority activity for farm investment. Specialist dairy farmers, being less diversified, are less likely to abandon milk production in the short run. Finally, specialist dairy farms are often in areas that do not support other viable (non-livestock) farming activities, with the result that the continuation of farming in the locality may well depend on the resilience of these farms as dairy farms. This combination of farming and behavioural characteristics makes specialist dairy farms a core target group of EU dairy policy.

Geographical distribution of milk production between and within Member States

Over many decades, the geographical location of milk production has been the result of a compromise between the advantages of proximity to local (liquid) milk markets and those of comparative advantage

[36] See for example Burrell, 1990; Mukhtar and Dawson, 1990; Alvarez and Arias, 2003.
[37] When more intensive production systems than are customary in Europe are used, economies of scale may still be available from expansion well beyond 1000 cows (this phenomenon is found, for example, in California).

in production due to agro-climatic conditions or to lower competition for land from other farming activities. Already in the late 1990s, it was noted that over half of the EU-15 milk was produced in just ten regions (Eck *et al*., 1996), including the Asturias and Galicia, Lower Normandy, Brittany, the Netherlands, Lower Saxony, Denmark, Ireland and western England. These regions are situated in the agro-climatic zone known as Atlantic (CEAS, 2000). Another 30% of milk production came from within the so-called Continental zone (eastern France, central and southern Germany, the southern tip of Sweden, northern Italy, and Austria). These two zones enjoy comparative advantage in milk production. The evolution of modern road networks and refrigerated chains from the dairy parlour to the processing dairy has greatly reduced the need for production to remain close to consumption centres. As a result, the trade-off between proximity to the market and location where production costs are favourable has not remained static.

However, the milk quota system has frozen production shares between Member States and, depending on the national rules for quota reallocation, has tended – to a greater or lesser degree – to inhibit the relocation of production within Member States. To the extent that this has happened, it has slowed down structural change in general – both the shift of production from smaller to larger herds, and the continuing concentration of production in specific geographic areas. There may, however, have been environmental benefits from less production mobility, both when dairying has been retained in areas where it can make a positive environmental contribution (such as in Less Favoured Areas) and when more intense concentration of dairying (with the associated environmental problems of manure disposal, heavy metal build up in soil and so on) has been avoided (see Baldock *et al*., 2008).

The dynamics of structural adjustment

Structural change usually occurs gradually. In the long run it is largely driven by external factors such as technological change and the adaptation of structures to best exploit the advantages of new technologies, cost and price developments in other competing sectors, and the general level of economic development, which determine job and investment opportunities outside agriculture.

When structural change involves changes in the farm's land holding, on-farm adjustments will depend on land availability, which might be related to neighbouring farms going out of business. Moreover, exit decisions are for the most part not reversible. Once milk production is abandoned, the probability of re-entering milk production is low. Reversibility is costly because milking equipment is very specific, and because it takes many years to rebuild a high performance herd. According to economic theory, firms exit only when returns can no longer cover variable costs in the medium term. This means that it may be economically rational for farms to continue for some years making negative net profit, but at the expense of below-market returns to their owned assets (land and family labour). The literature suggests that the closing down of a herd is also often prompted by factors like age, illness or absence of a successor etc.

5.8 Methodology used for answering the EQ1b: production restructuring

The methodology for addressing this evaluation question consists in choosing empirical indicators related to each aspect of structural change identified above, and examining their evolution over time before and after the 2003 reform. Changes in trends that occurred after 2003, or sudden discontinuities coinciding with the introduction of a particular policy measure, will be interpreted as evidence of a policy-induced impact. The basic steps in the methodology are defined below.

Most of the indicators are taken from official statistical collections (EU-FADN and Eurostat's FSS). However, we also exploit information gathered from the milk producers' survey conducted in 13 case study areas, in order to gain additional insights into the structural change process.

The information from the own survey is used merely to complement the official statistics, given the non-representativeness and the small size of the samples involved. When answers within and across samples tend to converge, this can be taken as providing meaningful information to support conclusions drawn from the statistics. However, when respondents' opinions are divided, the proportions given by the survey replies should not be taken as representing the breakdown of views in the sector as a whole. All that can be concluded is that there was no consensus among respondents.

5.9 Judgement criteria, indicators and information sources used for each indicator

The indicators used to evaluate the impacts of policy changes on structural change are given in Table 5.4, together with their statistical sources. The indicators are grouped according to the various dimensions of structural change identified above, beginning with a few general structural indicators.

The judgement criteria involve verifying whether trends in the indicators remain constant, or change in the post-2003 period in line with expectations as summarised below.

- The shift from market price support to a decoupled payment, resulting in a lower market price and the option for producers to exit dairying without losing the equivalent of the dairy premium, is expected to increase the falling trend in the number of dairy cows and herds, whilst providing an incentive for continuing producers to seek economies of scale through herd expansion and specialisation.
- Quota expansion in 2008 is expected to slow down the falling trend in numbers of herds and cows.
- More liberal quota exchange rules at Member State level and quota expansion are expected to lead to increased geographical mobility of production within Member States.

When verifying these expectations, it has to be borne in mind that structural change is a complex phenomenon, involving many non-policy factors as well as policy stimuli, and that it occurs gradually over the medium term. Therefore, it may not be possible to identify the above expected effects, even if present, from the appraisal of annual indicators over a small number of years.

Table 5.4 Indicators, data requirements and information sources relating to production restructuring for EQ1b

Indicator	Data requirement	Information sources
Number of cows and herds		
Dairy cows in the EU, total and by MS	Number of dairy cows in EU, total and by MS	Eurostat
Dairy herds in the EU, total and by MS	Number of farms with dairy cows	Eurostat
Farmer’s strategic choices (exit, continuation, reduction and expansion of milk production)	Information from farmers' responses	Producer survey in selected case study regions
Herd size restructuring		
Medium-term trend in EU herd size	Average herd size by Member State	Eurostat
Herd-size distribution by MS	Number of herds in different size classes over time	EU-FADN
Constraints on herd size expansion	Farm profitability	EU-FADN
Farmers’ use of high milk price	Farmers’ responses	Producer survey
Structure of specialisation		
Share of specialist dairy farms in total milk production	Share of specialist dairy farms in total milk production	EU-FADN
Average herd size for specialist and non-specialist dairy farms	Average herd size for specialist and non-specialist dairy farms	EU-FADN
Geographical structure of production		
Regional/national location of milk production	Quantity of milk production, EU and by MS	Eurostat
Geographical distribution of dairy cows by MS	Geographical distribution of dairy cows by MS	Eurostat

Table 5.5 Evolution of the number of dairy cows per MS over the period 1990-2010 (thousands)

		*1990	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average annual change (%)				
														'90-10	'90-'00	'00-'03	'03-'06	'06-10
EU-15	**Austria**	876	621	598	589	558	538	534	527	525	530	533	533	-2.5	-3.4	-3.5	-1.9	0.3
	Belgium	831	629	611	591	572	571	548	532	524	518	518	518	-2.3	-2.7	-3.1	-2.4	-0.7
	Denmark	769	644	628	613	589	569	558	555	551	566	574	573	-1.5	-1.8	-2.9	-2.0	0.8
	Finland	436	358	352	343	328	318	313	309	296	288	286	284	-2.1	-2.0	-2.9	-2.0	-2.1
	France	5,271	4,153	4,197	4,134	4,026	3,947	3,895	3,799	3,759	3,794	3,673	3,641	-1.8	-2.4	-1.0	-1.9	-1.1
	Germany	6,355	4,564	4,475	4,373	4,338	4,287	4,164	4,054	4,087	4,229	4,169	4,182	-2.1	-3.3	-1.7	-2.2	0.8
	Greece	242	180	172	152	149	150	152	168	150	154	145	144	-2.6	-2.9	-6.1	4.1	-3.8
	Ireland	1,322	1,153	1,148	1,129	1,136	1,122	1,101	1,087	1,088	1,088	1,088	1,088	-1.0	-1.4	-0.5	-1.5	0.0
	Italy	2,664	1,772	2,078	1,911	1,913	1,838	1,842	1,814	1,839	1,831	1,878	1,746	-2.1	-4.0	2.6	-1.8	-1.0
	Luxembourg	59	44	44	42	41	41	41	46	40	46	46	46	-1.2	-2.9	-2.3	3.9	0.0
	Netherlands	1,917	1,532	1,551	1,546	1,551	1,502	1,486	1,443	1,490	1,587	1,562	1,518	-1.2	-2.2	0.4	-2.4	1.3
	Portugal	380	355	338	341	329	338	324	307	306	301	289	275	-1.6	-0.7	-2.5	-2.3	-2.7
	Spain	1,575	1,141	1,182	1,154	1,118	1,057	1,018	942	903	888	828	845	-3.1	-3.2	-0.7	-5.5	-2.7
	Sweden	550	426	425	403	404	401	391	385	366	366	354	349	-2.2	-2.5	-1.8	-1.6	-2.4
	United	2,891	2,339	2,203	2,230	2,207	2,054	2,007	2,005	1,977	1,903	1,864	1,847	-2.2	-2.1	-1.9	-3.1	-2.0
	EU-15	26,138	19,910	20,002	19,551	19,257	18,732	18,375	17,974	17,900	18,088	17,807	17,588	**-2.0**	**-2.7**	**-1.1**	**-2.3**	**-0.5**
EU-10	**Cyprus**	22	24	24	26	27	26	25	24	24	24	23	23	0.2	0.9	4.0	-3.9	-1.1
	Czech Republic		529	496	464	449	429	437	417	407	400	384	375			-5.3	-2.4	-2.6
	Estonia	281	131	129	116	117	117	113	109	103	100	97	96	-5.2	-7.3	-3.7	-2.3	-3.1
	Hungary	491	355	345	338	310	304	285	268	266	263	248	239	-3.5	-3.2	-4.4	-4.7	-2.8
	Latvia	535	205	209	205	186	186	185	182	180	170	166	164	-5.7	-9.1	-3.2	-0.7	-2.6
	Lithuania	842	438	442	443	448	434	417	399	405	395	375	360	-4.2	-6.3	0.8	-3.8	-2.5
	Malta	8	8	8	8	8	8	8	8	8	7	7	6	-1.4	0.0	0.0	0.0	-6.9
	Poland		2,982	2,930	2,935	2,816	2,730	2,755	2,637	2,677	2,697	2,585	2,529			-1.9	-2.2	-1.0
	Slovakia		243	230	230	215	202	199	185	180	174	163	159			-4.0	-4.9	-3.7
	Slovenia		140	136	140	131	134	120	113	117	113	113	110			-2.2	-4.8	-0.7
	EU-10		**5,055**	**4,949**	**4,905**	**4,707**	**4,570**	**4,544**	**4,342**	**4,367**	**4,343**	**4,161**	**4,061**			**-2.3**	**-2.7**	**-1.7**
EU-02	**Bulgaria**	597	363	359	358	362	369	348	350	336	315	297	292	-3.5	-4.9	-0.1	-1.1	-4.4
	Romania	1,620	1,620	1,620	1,627	1,597	1,566	1,625	1,639	1,573	1,483	1,419	1,191	-1.5	0.0	-0.5	0.9	-7.7
	EU-27		26,947	26,929	26,441	25,922	25,237	24,891	24,305	24,176	24,229	23,682	23,132			**-1.3**	**-2.1**	**-1.2**

Notes: *Austria 1991, Finland 1991 (growth rates are corrected). Figure for Sweden is an estimate, based on the average change (1990-2000) for EU-15 without Sweden
Source: Eurostat.

5.10 Evolution of dairy cow numbers and dairy herds in the EU

Dairy cow numbers

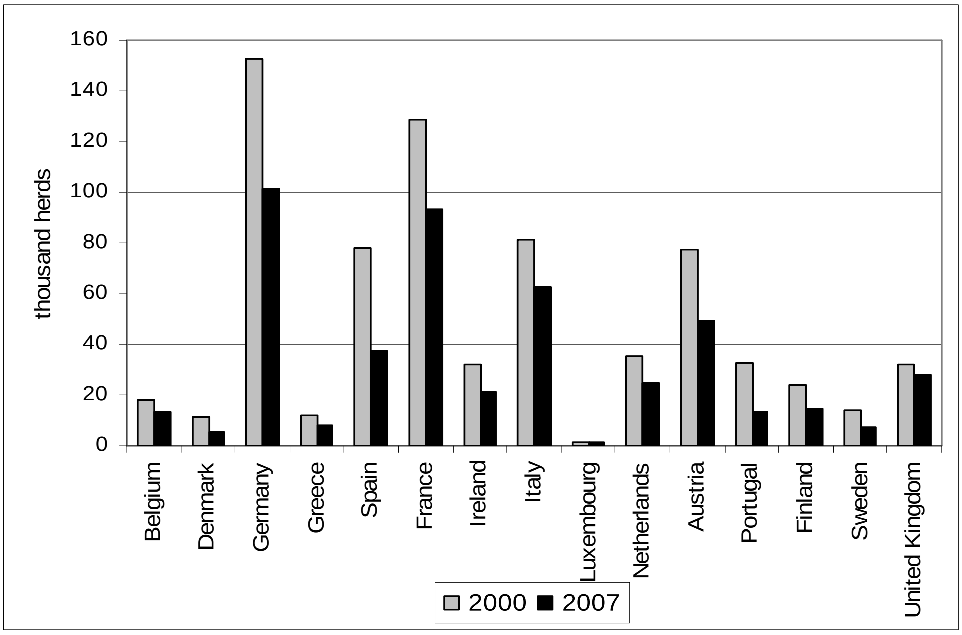
Table 5.5 shows the evolution of the number of dairy cows by EU Member States during the period 1990-2010. The total decline over the period 1990-2010 is nearly 33% for EU-15. The smallest average rates of decline are registered for Denmark, France, Ireland, the Netherlands and Portugal. Over the period 2000-2010, the declines are 12% (EU-15), 20% (EU-10) and 14% (EU-27). The average annual rates of decline per sub-period show that cow numbers fell less steeply after 2000 than before 2000 in EU-15. However, the rate of just over 1% per year in 2000-2003 and 2006-2010 doubled in the three years immediately after the 2003 reform. The slowdown in the rate of decline between 2006 and 2010 is what would be expected given the very high prices of 2007-8 and the 2008 increase in quota, but this is insufficient to establish causality.

The rate of decline in cow numbers was generally steeper in EU-10 after 2000 than in EU-15. However, it must be borne in mind that the impact of accession (either in anticipation of accession or after accession occurred) also plays a strong role in these developments.

Dairy herd numbers

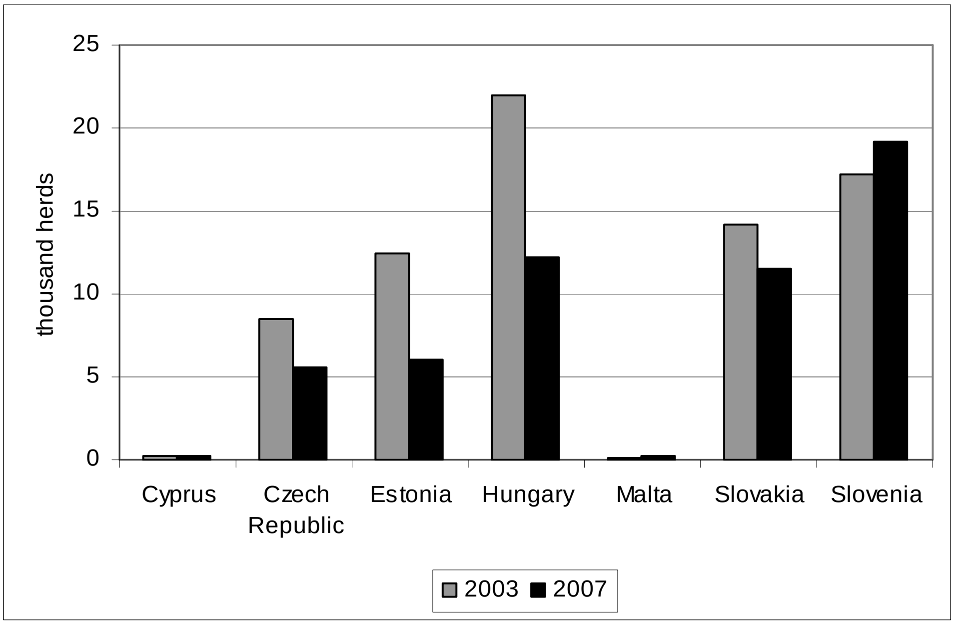
Between 2000 and 2007, herd numbers fell in EU-15 from 715.7 thousand to 480.5 thousand (-33%). The declines for individual Member States are shown in Figure 5.5. The largest falls occurred in Portugal (59%), Spain and Denmark (52%), and Sweden (49%).

Figure 5.5 Herd numbers in EU-15, 2000 and 2007



Source: Eurostat.

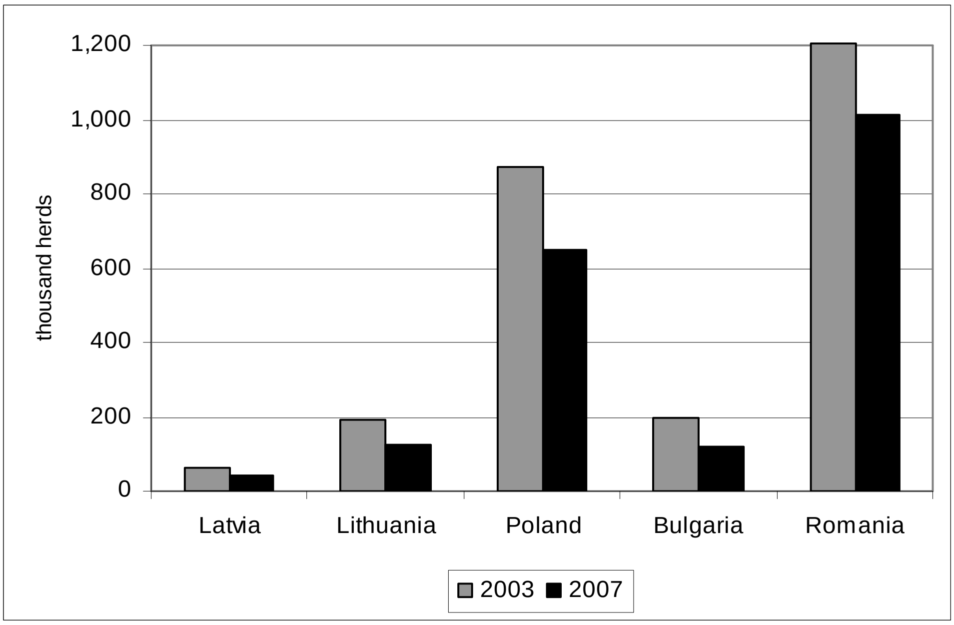
Figure 5.6 Number of dairy herds in seven countries of EU-10, 2003 and 2007



Source: Eurostat.

Figures 5.6 and 5.7 show the changes in herd size for the Member States of EU-10 and EU-02. Because of the large differences in scale, these figures are presented in two different graphs. Despite the larger scale in Figure 5.6, it is still too small to show the changes in Cyprus and Malta (from 250 for 240 herds in Cyprus, and from 170 to 190 herds in Malta). The number of dairy herds increased in both Malta and Slovenia between 2003 and 2007. In all other New Member States , the number of herds fell steeply over this period. This should be interpreted as a general effect of adoption of the CAP and of becoming subject to EU policies in all sectors (or, for Bulgaria and Romania, anticipation of membership), as well as the effects of technological change and the incentive to achieve economies of size, and not as specifically due to dairy policy. The largest falls in herd numbers in the New Member States between 2003 and 2007 occurred in Estonia and Hungary (declines of 51% and 45%, respectively).

Figure 5.7 Number of dairy herds in five countries of EU-10 and EU-02, 2003 and 2007



Source: Eurostat.

The statistics show that 713 thousand dairy herds disappeared during the period 2003-2007 in EU-27, or on average 489 herds per day. For specialist dairy farms, the rate is much lower, but nonetheless in the period 2003-2007 about 14,600 per year disappeared in EU-27.

Decision to quit

For this evaluation, case studies were conducted for 13 regions in the EU-27, in total involving 393 active milk producers and 50 milk producers who ceased dairy activity. In order to get more insight into the reasons for farm exits, the farmers in the case study regions were asked whether they had seriously considered quitting since 2003, and why.

Table 5.6 focuses on the reasons that caused respondents to seriously consider stopping milk production at some time after 2003. It is important to note that about two-thirds of respondents stated they had never in that period considered stopping milk production. Of the remainder (who did consider stopping but without doing so), four of the five most frequently cited reasons are economically oriented (milk and quota prices, price variability and lack of opportunity to grow – hence, to improve profitability). Dairy policy is a major factor determining these economic signals (see EQ2 for the evidence on the link between policy and prices). Environmental regulations, which was the second most frequent answer given, are also driven by policy but not specifically dairy policy.

Table 5.6 Reasons why milk producers have seriously considered stopping milk production at some time since 2003

Case study area	A	F-B	F-FC	D-B	D-L	IE	IT-ER	IT-L	LV	NL	PL	ES	UK	Sum	Rank
Answer:															
Yes, considered stopping because	12	6	3	11	7	7	13	13	7	4	12	11	13	119	
...low milk prices	*4*	*6*		*8*	*5*	*7*	*11*	*13*	*5*	*2*	*2*	*8*	*10*	81	*1*
...environmental regulations	*2*		*1*	*4*	*1*	*2*	*5*	*2*			*1*		*5*	23	2
...no potential to grow	*1*			*3*	*2*		*2*	*3*	*2*		*3*	*1*	*2*	19	*3*
...increased fluctuation of milk prices	*3*	*1*		*3*	*2*	*2*		*1*	*1*		*1*	*2*	*1*	17	*4*
...quota prices	*2*			*1*	*1*	*1*	*3*	*4*			*1*		*2*	15	5
...introduction of cross compliance				*3*	*1*	*2*	*1*	*2*			*4*			13	6
...no successor				*1*	*2*			*1*	*1*		*3*	*1*	*2*	11	*7*
...other off-farm activity become more profitable	*1*		*1*	*4*	*2*						*1*	*2*		11	7
...alternative farm activities became more profitable	*1*		*1*	*3*	*2*						*2*			9	9
...changes in quota regulation				*1*				*1*			*1*	*2*		5	10
Never considered stopping	18	24	27	19	22	22	18	18	23	25	18	24	12	270	

Notes: The case study areas were: A, Austria; F-B, France, Bretagne; F-FC, France, Franche-Comté; D-B, Germany, Bavaria; D-L, Germany, Lower Saxony; IE, Ireland; IT-ER, Italy, Emilia Romagna; IT-L, Italy, Lombardy; LV, Latvia, NL, Netherlands; PL, Poland; ES, Spain; UK, United Kingdom. The empty cells denote that no respondent chose this answer.

Bearing in mind the caveats expressed above about the small and unrepresentative national samples in the producer survey, one should be cautious about interpreting most of these answers (based on the pooled sample) as reliable evidence of policy impacts. At most, it can be said that there is consistent evidence across nearly all the case study areas that low milk prices were seen as a significant 'push-factor'.[38] The only exception to this was among the producers surveyed in Franche-Comté. However, it must be borne in mind that in this particular sample, over half the dairy farms were cooperatively owned, nearly all of them produced milk for a quality-label cheese, and for more than two-thirds of them, LFA payments were seen as important or very important. Producers in the two French case study samples, the Dutch one and the one in Spain stand out as being the most likely not to have considered abandoning milk production since 2003. By contrast, this option was considered by over half the respondents in the UK sample.

Impact of policy changes on milk production strategy

Table 5.7 shows that the impact of policy changes on farmers' incentives to increase or reduce the scale of their milk production, or to quit, was mixed. On the one hand, for four of the policy changes mentioned, about half or more of the respondents considered that the policy changes were not relevant and therefore had no impact on their strategic production decisions. On the other hand, other changes affected behaviour more. The 2003 decision to maintain the quota scheme until 2015, and the later decision to increase quota by annual amounts, provided incentives to expand for a significant share of producers. The various policy payments had an expansionist effect for a smaller share of producers. The switch from price support to a dairy premium to a decoupled payment (merged with the Single Farm Payment) was seen by the majority of respondents either as irrelevant or simply as an incentive to continue production unchanged. The decision to quit dairying was not made more attractive by any of the policy changes for nearly all producers. However, it must be stressed that these respondents are producers *who did not quit*.

Table 5.7 Effect of various policy changes on the incentive to decrease, continue, or expand dairy production (number of answers)

Policy/Policy change	Number of answers out of 393	not relevant	stop	decrease	continue at current level	increase
Decision taken in 2003 to maintain milk quotas until 2015	387	154	4	2	123	104
Introduction of dairy premium	390	190	2	3	130	65
Introduction of Single Farm Payments	389	165	3	2	150	69
Decoupling of dairy premium	389	226	6	4	113	40
Confirmation in 2008 to abolish milk quotas in 2015	357	167	10	4	92	84
Rural Development Aids	383	198	1	2	88	94
State Aids	386	208	3	0	99	76
Annual quota expansion	341	118	4	0	56	163

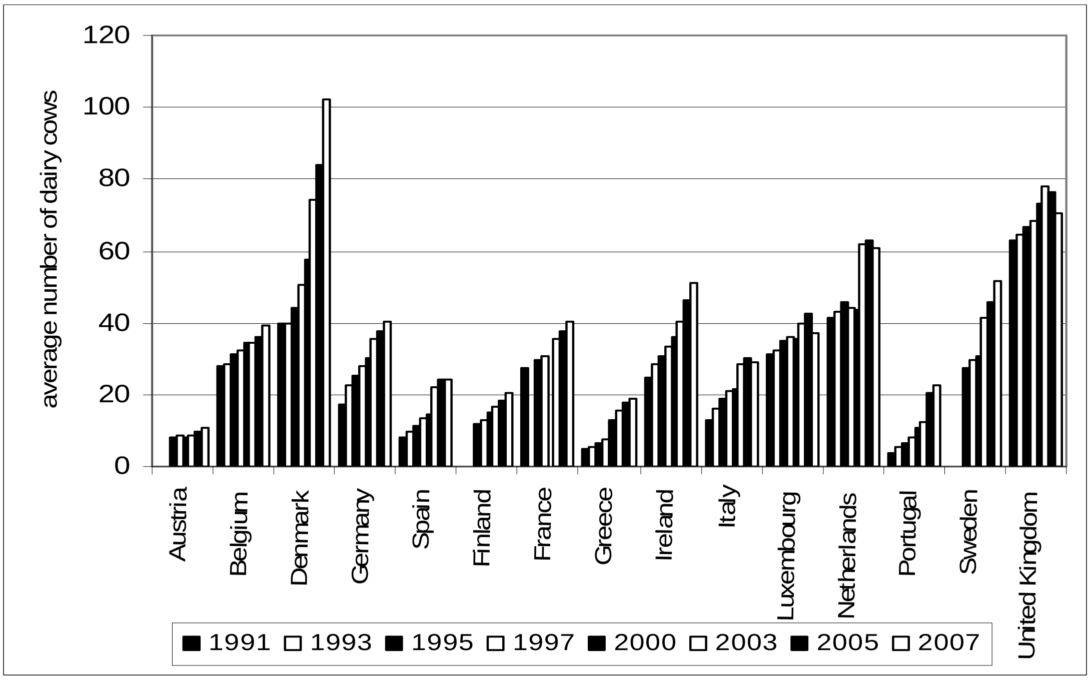
5.11 Herd size restructuring

Herd size

Figure 5.8 shows the average number of dairy cows per herd (all dairy herds) for EU-15 Member States from 1991 to 2007.

[38] This was also confirmed in the interviews with producers who had stopped. However, these samples of former milk producers are so small that they have anecdotal value only.

Figure 5.8 Average herd size, EU-15 Member states, 1991-2007



Source: Eurostat (FSS).

The strongest growth in herd size occurred in Denmark, from 40 cows over herd to 102 cows per herd. the Netherlands, which also had 40 cows per herd in 1991, reached an average of 61 cows in 2007. In the UK, which had the largest herds in EU-15 in 1991 (average 63 cows), average herd size peaked at 78 cows in 2003 but ended the period shown at just 70 cows. This indicates that some very large herds were abandoned or broken up in the period 2003 to 2007, and possibly that new small herds were started.

Table 5.8 Growth in average herd size (% per year), EU-15, 1991-2007, and sub-periods

	1991-2010	1991-2000	2000-2003	2003-2005	2005-2007
Austria			2.2	4.6	2.7
Belgium	1.8	2.5	-0.1	1.5	2.9
Denmark	5.1	4.2	8.7	4.3	6.8
Germany	4.6	6.3	6.0	1.9	2.3
Spain	5.9	6.7	14.3	3.1	0.3
Finland			4.1	3.0	3.7
France	2.1			2.0	2.5
Greece	7.7	12.0	6.9	4.1	2.5
Ireland	3.9	4.4	3.7	4.6	3.3
Italy	4.4	6.0	9.3	2.1	-1.0
Luxembourg	0.9	1.4	3.8	2.3	-4.5
Netherlands	2.1	0.7	12.4	0.6	-1.3
Portugal	9.7	11.9	4.1	18.9	3.5
Sweden			10.8	3.2	4.1
United Kingdom	0.6	1.7	2.1	-0.8	-2.7

Source: Eurostat.

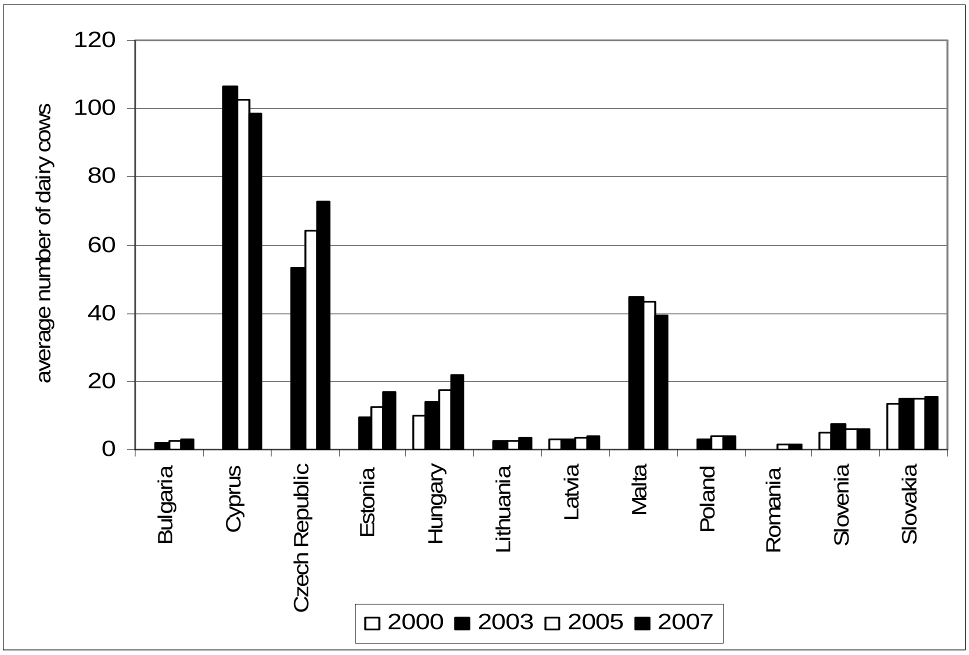
Table 5.8 shows the growth in average herd size for the Member States of EU-15, during the period 1991-2007, and for sub-periods thereof. There is no consistent pattern. Most Member States had a lower growth in herd size in 2005-2007 than in 2000-2003 (Denmark, Germany, Spain, Greece, Ireland, Portugal, Sweden) or even negative growth in the last period (Italy, Luxembourg, the Netherlands and the UK), but this was not true for Austria, Belgium and France. It is not possible to discern a change in these trends beginning around 2003-4 that could be attributed to the 2003 policy reforms.

Baldock *et al*. (2008, p.102) present a regression showing that 86% of the differences between Member States in the growth of average herd size between 1989 and 2005 can be explained by just two factors: the average herd size at the start of the period, and the degree of the restrictiveness of the quota transfer regime operated by the respective Member State. The smaller the herd size at the start of the period, and the more market-oriented the quota transfer regime, the larger the increase in average herd size. This indicates that the more restrictive rules for quota transferability operated by some Member States did indeed slow down the rate of herd size expansion. It follows that, when quota restrictions become less constraining (because ceilings are raised, or are no longer binding) and providing producers expect this situation to continue, herd size expansion should increase. As Figure 2.7 shows, from 2004/5 onwards, the quota ceiling at EU level was not met, and from 2006/7 quota was increased for some Member States. Therefore, the period 2005-2007 could be characterised as one in which quota limits became *less* restrictive.

The expectation of faster herd expansion after 2004/5 is not supported by the evidence: rates of herd expansion were *lower* in 2005-2007 than in 2003-2005 in nine EU-15 Member States, and four of them had contractions in herd size (Table 5.7). This result is explained by the fact that other factors occurring at the same time – dairy policy changes (decoupling, lower prices), but also higher crop prices (which increase dairy costs and the opportunity cost of remaining in dairy farming) - were working in an opposite direction. Without a true counterfactual to indicate what the growth rate of herd size would have been while keeping these other factors constant, it is impossible to conclude that quota constraints did not dampen herd-size expansion in the first part of the decade. This analysis remains inconclusive.

The picture regarding herd size evolution is somewhat different in the Member States of EU-10 and EU-02. Figure 5.9 shows the main trends in these countries. First, there is great heterogeneity with respect to average herd size between countries. The largest herds are in Cyprus (around 100 cows), and the smallest in Bulgaria and Romania (1-3 cows). In most Member States, herd size has increased in each sub-period since 2000. The exceptions are Cyprus and Malta (in the latter Member State, the number of herds rather than herd size increased). Again, one should be cautious about attributing these trends to changes in dairy policy alone, since the post-2003 dairy reform period coincided with the immediate post-accession period for most of these countries.

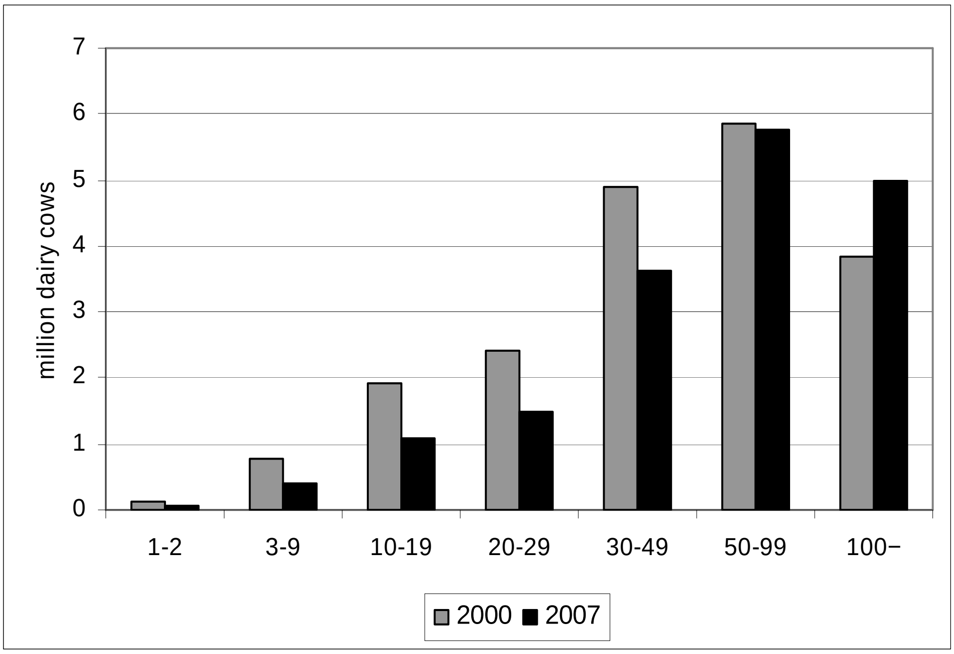
Figure 5.9 Average herd size, EU-10 and EU-02, 2000-2007



Source: Eurostat (FSS).

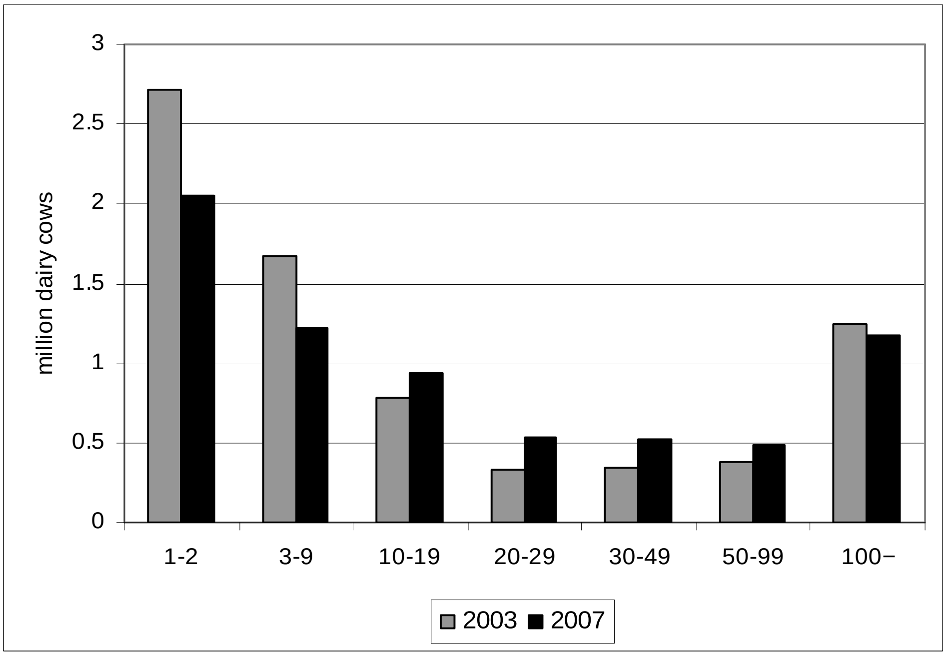
Herd size distribution

Figure 5.10 Number of cows per size class in EU-15, 2000 and 2007



Source: Eurostat (FSS).

Figure 5.11 Number of cows per size class in EU-10, 2003 and 2007



Source: Eurostat (FSS).

Figures 5.10 and 5.11 show the shape and change in the herd size distribution over the period 2000-2007 for the EU-15 and EU-10, respectively (for details at the Member State level see also section 2.3). The majority of EU-15 dairy cows were kept in herds of 50 dairy cows and larger. In a striking contrast, in the EU-10 most of the dairy cows were in herds of 10 dairy cows or less, even though the number of dairy cows kept in relatively small herds declined substantially over time. In the EU-10 the herd size distribution has a bimodal character. This is because many very small dairy herds are kept for the purposes of the farm household’s own dairy consumption, either on subsistence farms or on farms that are commercial farms with respect to other commodities, but which keep a few dairy cows for their own consumption.

Between 2000 and 2007, only the largest herd size group (≥100 cows) in EU-15 acquired more cows. By contrast, between 2003 and 2007, in EU-10 the total number of cows in all herd size groups with more than 10 cows increased whereas the smallest herd sizes experienced a net reduction in cow numbers.

Tables 2.31 and 2.32 provide data on this process at Member State level. Regarding the distribution of herds, in 2007 at least 25% of all herds in Denmark, Cyprus and the UK had 100 cows and more although only 2% of all EU dairy herds had more than 100 cows or more. By contrast, more than 95% of all dairy herds in Lithuania and Romania had fewer than 10 dairy cows. The points in the size distribution where herd numbers are growing depend on the current (average) size of herds. For example, in the Netherlands, where herds are already on average quite large, growth in herd numbers occurred only for the largest size group (> 100 cows). By contrast, in Austria, the size group 30-49 cows was the smallest to register a net increase in herd numbers. Regarding the distribution of dairy cows across size classes, in 2007 51% of the EU dairy cow population was kept in herds of at least 50 head. In 2000 this share was only 41%. Cyprus, Czech Republic, Denmark, Slovakia and the United Kingdom all had at least 90% of their dairy cows in herds of 50 cows or more in 2007. By contrast, in Austria, Bulgaria, Lithuania, Poland, Romania and Slovenia more than 60% of the dairy cow population was kept in herds of 19 or fewer dairy cows.

Table 5.9 Share (%) of all farms with dairy cows having a positive net profit

	2000	2001	2002	2003	2004	2005	2006	2007
Belgium	54	60	49	55	54	65	69	77
Denmark	16	8	12	12	10	19	28	46
Germany	22	22	18	17	33	43	44	65
Greece	45	46	54	57	73	85	83	92
Spain	53	67	65	65	55	61	61	59
France	33	34	46	40	43	48	45	54
Ireland	36	37	36	43	40	42	31	47
Italy	31	32	33	30	33	39	36	43
Luxembourg	49	55	42	54	57	67	57	71
Netherlands	32	37	33	29	30	43	40	57
Austria	26	34	30	20	26	34	34	41
Portugal	28	40	48	46	54	54	71	63
Finland	16	23	23	22	16	18	13	20
Sweden	5	5	8	8	0	7	8	18
United Kingdom	20	38	21	29	32	38	36	57
EU-15	**30**	**34**	**34**	**32**	**37**	**44**	**43**	**53**
Czech Republic					39	34	37	55
Estonia					48	40	33	43
Hungary					47	23	36	30
Lithuania					70	53	46	45
Latvia					44	52	43	45
Malta					0	42	50	48
Poland					26	26	29	33
Slovakia					52	37	18	39
Slovenia					27	14	14	22
EU-10					**30**	**28**	**30**	**35**
Bulgaria								67
Romania								20
EU-02								**24**

Source: EU-FADN.

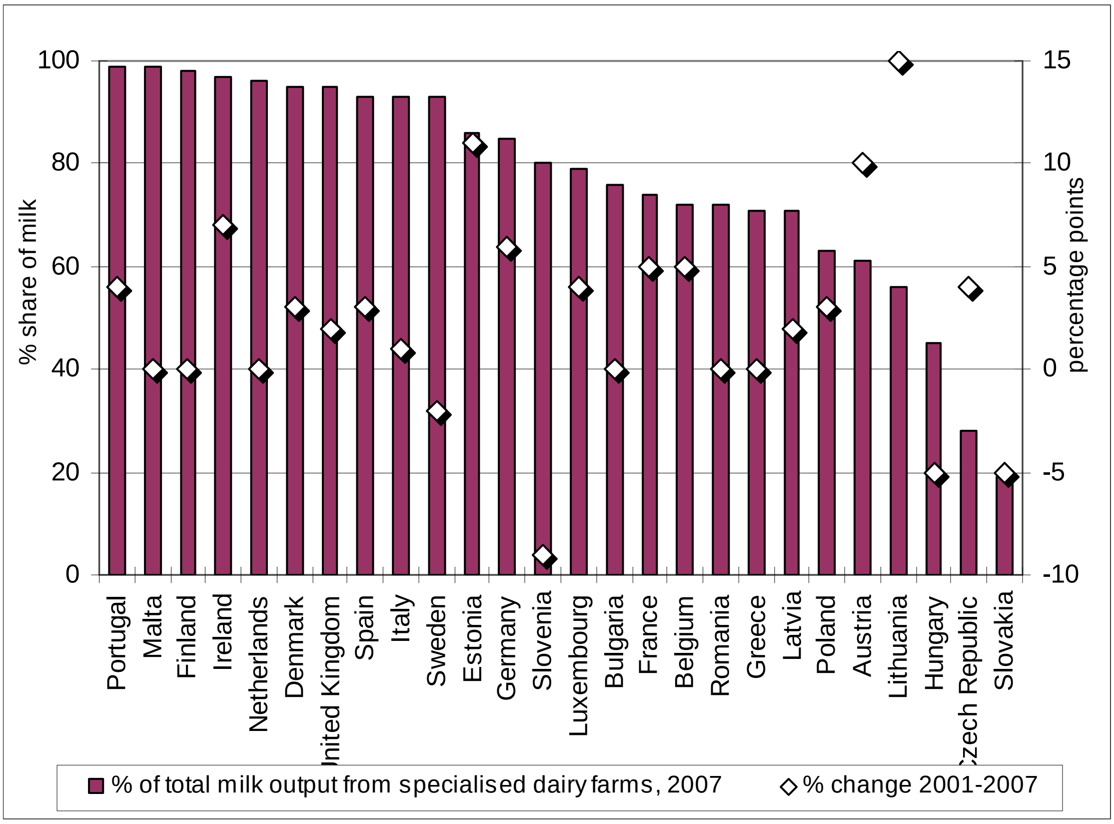
The evidence on profitability presented in Table 5.9 sheds some light on the incidence of financial constraints on herd size expansion. Following 2004, there was a marked increase in the share of EU-15 FADN farms with dairy herds that earned a positive net economic profit. This can be interpreted as an indicator of the proportion of dairy herds that did not face severe financial constraints. However, this increase could well be the effect of the larger than usual exit of farms in EU-15 during these years, assuming that those leaving would have been mainly the less profitable herds. Moreover, it has to be borne in mind that EU-FADN is not a fully representative sample, as it does not cover farms below the minimum economic size threshold (which varies between Member States, tending to be higher in Member States with larger average herd sizes) and is designed to reflect population shares according to the dimensions 'region', 'type of farming' and 'economic size class' only.

The producer survey asked respondents how they used the extra revenue earned during the period of high milk prices in 2007-2008. In particular, producers were asked whether the revenue was used (among other options) for herd expansion (animals), to buy more quota and/or to finance investments allowing expansion. The same questions were asked regarding any future hypothetical windfall returns due to high prices. No clear picture emerges across the own survey. It is certainly not warranted to conclude from respondents' answers that producers were already expansion-minded and seized, or would in the future seize, such a windfall opportunity to finance herd expansion.

5.12 Structure of specialisation

Figure 5.12 ranks Member States according to the share of total milk output coming from specialist dairy farms.

Figure 5.12 Share (%) of total delivered milk coming from specialist dairy farms (2007) by Member State and change in this share (measured in percentage points), 2001-2007



Source: EU-FADN.

For 9 out of 27 Member States, more than 90% of the raw milk produced comes from specialist dairy farms. In sixteen Member States, the share of specialist dairy farms increased between 2001 and 2007, and the two largest increases (Austria and Lithuania) occurred where the share was still relatively small in 2007. In six other Member States, there was no change in the share. However, four Member States (Hungary, Slovenia, Slovakia and Sweden) had negative rates of change in specialisation, implying that their dairy farm sector shows a tendency to de-specialise. Thus, there is a trend towards more specialisation across the EU, but with some exceptions at Member State level.[39]

Table 5.10 shows that herds on specialist dairy farms are in general larger than those on non-specialist dairy farms everywhere in the EU, but the absolute sizes of both categories are much smaller in EU-10 and EU-02. More disaggregated information by Member States can be found in Table 2.35. About 87% of total milk production in EU-15 comes from specialist dairy farms, and for the EU-10 this share is 56%. As is shown in Section 2.3, average numbers hide a pattern of structural change that is more complex: the number of relatively small herds tends to decline, whereas the larger herds tend to increase.

Table 5.10 Average number of dairy cows per specialist and non-specialist dairy farm in the EU-15, EU-10, EU-02 and EU-27 for the period 2000-2007

		2000	2001	2002	2003	2004	2005	2006	2007
EU-15	specialist	41	41	44	46	47	48	51	51
	non-specialist	25	25	27	28	27	25	24	25
EU-10	specialist					18	17	18	18
	non-specialist					8	8	7	8
EU-02	specialist								5
	non-specialist								3
EU-27	specialist								31
	non-specialist								10

Source: EU-FADN.

Between 2000 and 2004, specialist herds in the EUR-15 EU-FADN sample had on average 64-74% more dairy cows than non-specialist dairy herds (Table 5.10). However, after 2004, this gap became greater: 92% in 2005, 113% in 2006, and 104% in 2007.

Whilst it is important not to draw conclusions about trends from the EU-FADN sample (whose composition changes every year) or from just four years' data, this apparent acceleration in expansion of specialist dairy herds compared with herds on non-specialist dairy farms raises the question of whether any of the policy changes happening at that time could have triggered such a development. The clear guidelines on future dairy policy trends given in the 2003 reform, together with the commitment of these specialist dairy producers to a long-term future in dairying, may have triggered a burst of herd expansion that was not shared by the more diversified, arguably less committed milk producers. By contrast, the size of herds on both specialist and non-specialist dairy farms remained more or less constant in EU-10 for the post-accession years.

Table 5.11 Milk yield evolution for specialist and non-specialist dairy farms in EU-15, EU-10, EU-02 and EU-27, kg/cow

		2000	2001	2002	2003	2004	2005	2006	2007	growth rate, %
EU-15	specialist	6,364	6,407	6,531	6,627	6,714	6,819	6,980	7,018	1.41
	non-specialist	5,641	5,665	5,809	5,908	5,975	6,096	6,124	6,327	1.65
EU-10	specialist					5,192	5,367	5,530	5,567	2.36
	non-specialist					4,415	4,621	4,523	4,771	2.62
EU-02	specialist								3,889	
	non-specialist								3,254	
EU-27	specialist								6,707	
	non-specialist								5,523	

Source: EU-FADN.

[39] Note that, for Italy, the results in this figure contradict the evidence reported in the case study analysis, which comes from the national authorities and is not based on Eurostat's FSS.

Table 5.11 shows that the milk yields of herds on specialist dairy farms in the EU-FADN database are consistently above those of herds on non-specialist dairy farms (around 12% higher on average in EU-15, 18% higher in EU-10 and nearly 20% higher in EU-02). This finding highlights a major reason why the share of herds on specialist dairy farms matter for the performance of the sector. Although measured yield growth is slightly higher for non-specialist dairy herds, the difference is so small that this gap will remain more or less constant in coming years.

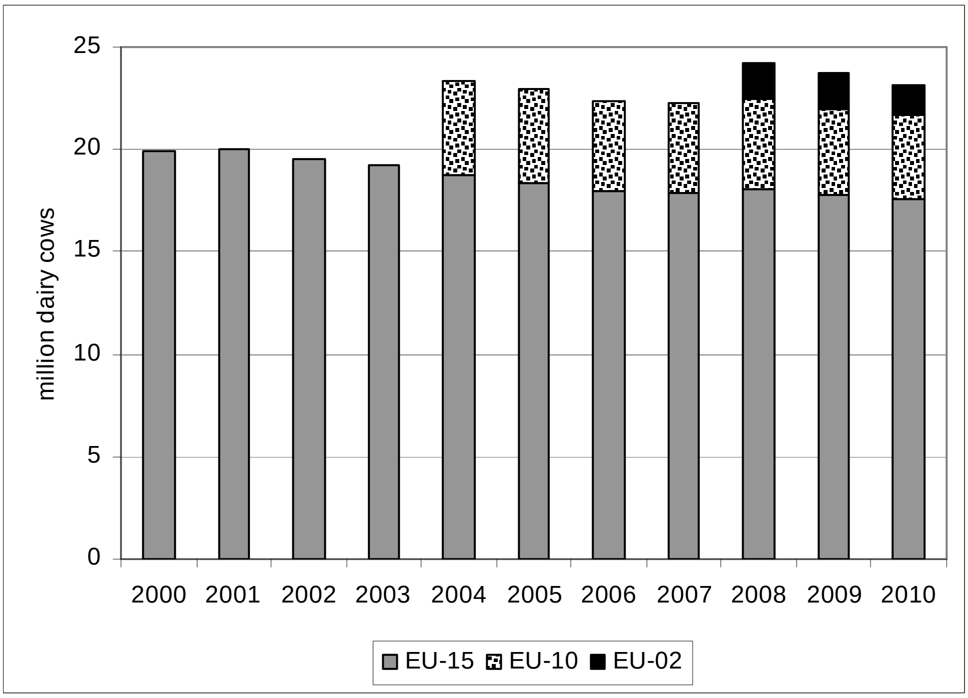
5.13 Geographical structure of production

Since 1984, the milk quota scheme has fixed national quota ceilings on milk deliveries and direct sales off farms. These ceilings have remained very stable over the years, with some occasional adjustments at the same rate for all Member States accommodate enlargements, or for particular Member States for exceptional reasons. Table 2.38 sets out the national quota ceilings for each year since 2000/1 up to 2014/15, when the quota scheme will end.

The structure of milk supply and of dairy herds at Member State level, which depends strongly on these quota limits, has also been very stable. Table 5.12 shows the evolution of milk production shares at Member State level. There is more movement in these shares in the post-reform period. However, it is impossible to discern any regional bias. For example, Italy's share increases but that of the other three Mediterranean countries remains stable. The share of France trends down a little, but that of Germany increases.

In 2009, 81% of EU-27 milk was produced in EU-15, about 15% in EU-10, and about 4% in EU-02. Figure 5.13 shows the geographical distribution of dairy cows between EU-15, EU-10 and EU-02. The impact of two enlargements is clear: initially there is a jump in cow numbers, but with increasing yields – especially among the lower-yielding herds in new member countries - and with quota limits unchanged, EU total cow numbers begin to fall again.

Figure 5.13 Number of dairy cows in EU regions, 2000-2010



Source: Eurostat.

Table 5.12 Share (%) of each Member State's milk output in total EU-27 milk production

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	2.2	2.2	2.3	2.2	2.1	2.2	2.1	2.2	2.2	2.2
Belgium	2.3	2.2	2.2	2.2	2.1	2.1	2.0	2.0	1.9	2.0
Denmark	3.2	3.0	3.2	3.2	3.1	0.0	3.1	3.2	3.1	3.3
Finland	1.7	1.7	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.6
France	16.7	16.5	17.5	17.0	16.5	17.1	16.5	16.2	16.3	15.8
Germany	18.9	18.8	19.3	19.7	19.0	19.7	18.9	19.7	19.3	19.8
Greece	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Ireland	3.5	3.6	3.6	3.7	3.6	3.5	3.6	3.7	3.5	3.4
Italy	7.2	7.2	7.4	7.4	7.2	7.6	7.4	7.7	7.6	7.7
Luxembourg	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Netherlands	7.3	7.5	7.4	7.6	7.3	7.5	7.4	7.7	7.8	8.0
Portugal	1.4	1.3	1.5	1.3	1.4	1.4	1.3	1.4	1.4	1.4
Spain	4.2	4.3	4.6	4.6	4.4	4.5	4.3	4.4	4.3	4.2
Sweden	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.0	2.0
United Kingdom	9.7	9.8	10.3	10.4	9.9	10.1	9.7	9.8	9.2	9.2
Cyprus	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Czech Rep.	1.9	1.9	1.9	1.9	1.8	1.9	1.9	0.0	1.9	1.9
Estonia	0.4	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
Hungary	1.4	1.4	1.5	1.4	1.3	1.3	1.2	1.3	1.2	1.2
Latvia	0.5	0.6	0.6	0.5	0.5	0.6	0.5	0.6	0.6	0.6
Lithuania	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.2
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Poland	7.9	7.9	8.2	8.2	8.0	8.3	8.1	8.4	8.4	8.4
Slovakia	0.7	0.8	0.8	0.8	0.7	0.8	0.7	0.7	0.7	0.6
Slovenia	0.4	0.4	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.4
Bulgaria	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.7
Romania	3.3	3.4	0.0	0.0	3.4	3.4	3.6	3.5	3.3	3.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Eurostat.

Geographical mobility of quota *within* Member States has continued throughout recent decades, despite some regional barriers to quota transferability between regions of certain Member States. Evidence reported in Baldock *et al*. (2008) up to 2005/6 shows that regional reallocation was generally accompanied by increases in average herd size in *all* regions, both those regions receiving a net gain in quota and those with a net decline, but that there was usually a decline in *herd numbers* in those regions that lost quota (and sometimes even in gaining regions). This emphasises that regional mobility is closely associated with herd-size restructuring. Data could not be found for this report on the most recent trends in regional shifts in the location of production. However, given that quota is now more mobile than it was at the start of the century (because of a relaxation of regional restrictions, as for example in Germany, or because it is now cheaper or 'free' on the market because national ceilings are no longer binding), we can conclude that the regional shares of herds and production have become more dynamic because of the policy changes.

Table 2.36 provides information about the geographical distribution of dairy cows over LFA and non-LFA areas. In the period 2003-2007 the share of dairy cows in the total number of dairy cows that is kept in LFA areas has increased for Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Poland, Romania, Slovakia and Slovenia. Member States having a relatively large share of their dairy cow population in mountainous LFS areas are Finland (76%), Austria (66%), Slovenia (50%) and Slovakia (46%). All of Luxembourg is classified as a LFA.

Table 5.13 Average annual change (%) in number of dairy herds in different regions by Member State

	1995-2004[1]			2005-2007			
	LFA mountainous	LFA non-mountainous	non-LFA	LFA mountainous	LFA non-mountainous	non-LFA	ALL
Austria				-4.9	-4.5	-6.1	-4.8
Belgium				-5.6		-6.5	-6.3
Bulgaria							-11.0
Cyprus							
Czech Republic				-15.1	6.2	-9.1	-9.0
Denmark						-9.9	-9.9
Estonia				-19.7		-17.7	-18.8
Finland				-8.8	-7.5		-7.8
France	-1.3	-1.0	-1.5	-6.5	-4.6	-5.2	-5.3
Germany		-1.9	-2.0	-4.0	-3.6	-5.0	-4.3
Greece				-12.1	-9.1	-5.3	-9.4
Hungary				-18.1		-10.0	-13.5
Ireland		-1.5	-2.3	-5.2		-5.7	-5.4
Italy	-1.3		-1.7	9.9	0.7	0.5	1.4
Latvia						-7.4	-7.4
Lithuania				-15.1		-15.1	-15.1
Luxembourg				6.0			6.0
Malta				2.7			2.7
Netherlands			-1.5			2.1	2.1
Poland				-5.4	-8.1	-5.0	-5.4
Portugal				-6.5	-9.6	-6.6	-7.7
Romania							-5.5
Slovakia				-5.3	-9.9	16.4	-7.4
Slovenia				-2.0	1.2	-6.5	-1.3
Spain	-2.4	-2.0	-2.9	-3.4	-5.4	-11.7	-6.2
Sweden				-9.5	-10.1	-7.1	-8.9
United Kingdom		-1.3	-1.7	4.4		2.9	3.4

Notes: 1) For the period 1995-2004, data are missing for all except seven Member States.
Source: Baldock et al., 2008; EU-FADN.

Table 5.13 summarises some evidence on changes in numbers of dairy farms (herds) in and outside Less Favoured Areas. The rather sparse evidence on relative rates of change during 1995-2004 shows a consistent pattern: dairy farm numbers declined relatively less steeply inside LFAs, suggesting that the package of policy incentives provided to LFA farmers was able to counteract the pressures to quit. The picture is much harder to read in the 2005-2007 period. In Austria, Belgium, Germany and Spain, for example, the previous pattern of proportionately fewer exits in LFAs persists. In other Member States, the rate of decline is *greater* for LFA dairy farms (e.g. Greece, Hungary, Poland), and in yet other Member States, LFAs *gained* dairy farms (e.g. Italy, the UK). It is not possible to link these changes to specific policy changes.

5.14 Conclusions

Number of dairy cows and herds

The long-term rate of decline in dairy cow numbers was slower in the early 2000s than during the 1990s. In the period 2003-2006 the rate of decline in EU-15 compared with 2000-2003 was more than double. It was also greater by at least 50% in the Member States of EU-10 and EU-02. However, as the period 2003-2006 includes the year of accession and the immediate post-accession period for the countries of EU-10, other factors besides dairy policy changes also underlie these adjustments.

Between 2000 and 2007, 33% of dairy herds disappeared in EU-15. In Spain, Portugal, Sweden and Denmark the loss was around 50% or more. Between 2003 and 2007, 713 thousand dairy herds ceased operation in EU-27. This represents a massive restructuring and concentration of EU milk production. The issue is whether it can be linked to the policy changes under review.

The producer survey (among producers still active in early 2011) indicated that about two-thirds of them had *not* considered stopping milk production in the period since 2003, and those who had given this option serious consideration tended to cite economic factors (in particular low milk prices) rather than specific policy changes as the reason. The reduction in intervention prices, as decreed in the 2003 reform, was accompanied by a gradual lowering of milk prices during 2004-2006, and this lower level reappeared in 2009 after the price spike due to high world demand in 2007-8. However, other factors that the producers surveyed considered to be incentives for stopping production were environmental regulations, insufficient potential to grow and greater volatility in milk prices.

In conclusion, structural evolution with respect to numbers of cows and herds was greater in the three years 2004-2006 than in 2000-2003 in EU-15. The decline in EU-15 cow numbers almost ceased between 2006 and 2010; data on the evolution of herd numbers for this latest period are not available. Structural change is a complex and gradual process. The observed changes cannot be linked directly to policy measures or policy changes.

Herd size restructuring

Rates of herd-size increase vary greatly between Member States. Many Member States in EU-15 had lower growth in average herd size in 2005-2007 than 2000-2003, indicating that the higher rate of herd decline in that sub-period was balanced by a higher rate of decline in cow numbers. There is no clear-cut evidence linking these developments to specific policy changes. Prior empirical evidence of the effect of quota restrictiveness on herd-size growth created the expectation that average herd size would increase *faster* from 2004-2005 onwards, when quotas became less restrictive for a variety of reasons. However, this expectation is not strongly supported by the data.

Herd sizes in EU-10 and EU-02 are generally much smaller than EU-15. The post-2003 period in these countries is marked by a number of adjustments due to adopting the CAP as a whole and the pressures of the single European market. Therefore, no conclusions about the impacts of specific dairy policy changes can be based on the structural developments observed in the dairy sectors of these countries.

Structure of specialisation

After the 2003 reform, herds on specialist dairy farms in EU-15 continued to expand in size faster than herds on other types of farm. Several factors contributed to this different trend. Among these factors is the clarity about future dairy policy changes and the long-term horizon for the dairy sector that was set out in the 2003 reform. Given the commitment of specialist dairy producers to a long-term future in dairying, this perspective together with the fall in quota prices supported a faster rate of herd expansion for specialist dairy herds than was observed for the more diversified, arguably less committed milk producers on other types of farm. In EU-10, the size of herds on both specialist and non-specialist dairy farms remained more or less constant. The share of total milk supply coming from specialist dairy farms varies greatly across EU-27.

Geographical relocation of production

National quota ceilings establish upper limits to milk deliveries and therefore to production capacity, and the shares of Member States national quota in the whole have changed only marginally. Since 2004/5, there has been a little movement in national shares of milk supply, with a slight increases in Germany and the Netherlands, slight falls in the UK over the period and in France in 2009-2010, but no clear trends for EU-10 Member States.

A certain degree of geographical mobility of milk production and dairy capacity *within* Member States has been maintained throughout the quota period. The lack of regional data makes it impossible to examine whether this process has accelerated or become more responsive to market and policy signals since the 2003 reforms and their implementation. However, data on the percentage decline in dairy herds from LFAs and non-LFAs suggest that the tendency, observed over 1995-2004, for dairy herds in LFAs to quit less readily than those in non-LFAs appears to have been disrupted in the mid-2000s, leading to quite heterogeneous patterns across Member States. It must be stressed that the data assembled here are rather patchy for the earlier period, and that if there is a real change in the pattern, it is not necessarily related to or solely due to the dairy policy changes under review here, although hypotheses to support this view could be constructed.

Summary of findings for each indicator, EQ1b

<table>
<tr><th>Indicator</th><th>Expected result</th><th>Evidence found</th></tr>
<tr><td colspan="3">Number of cows and herds</td></tr>
<tr><td>Dairy cows in the EU, total and by MS</td><td>The falling secular trend was expected to increase.</td><td>The falling trend accelerated, relative to 2000-2003. This continued up to 2007, when market conditions changed due to disruption from the world market.</td></tr>
<tr><td>Dairy herds in the EU, total and by MS</td><td>Continuation of secular decline was expected.</td><td>The expected result was observed.</td></tr>
<tr><td>Farmer’s strategic choices (exit, continuation, reduction and expansion of milk production)</td><td>It was expected that the decoupling of the dairy premium would create an incentive for milk producers to cease production.</td><td>Such an incentive was not reported, either by continuing producers or those who had quit since the policy changes were introduced.</td></tr>
<tr><td colspan="3">Herd size restructuring</td></tr>
<tr><td>Medium-term trend in EU herd size</td><td rowspan="2">The secular trend in average herd size was expected to continue, and possibly accelerate (due to easier availability of quota, more price pressure, decoupled payment)</td><td rowspan="2">The secular trend continued. In some Member States, it accelerated after 2004.</td></tr>
<tr><td>Herd-size distribution by MS</td></tr>
<tr><td>Constraints on herd size expansion</td><td rowspan="2">Evidence was sought, no prior theory-based expectations were formed.</td><td>The proportion of profitable specialist dairy farms increased.</td></tr>
<tr><td>Farmers’ use of high milk price</td><td>Windfall returns were used in various ways. There is no clear indication that they helped to ease a financial constraint on herd expansion.</td></tr>
<tr><td colspan="3">Structure of specialisation</td></tr>
<tr><td>Share of specialist dairy farms in total milk production</td><td rowspan="2">The pre-reform trend towards specialisation was expected to continue, and possibly accelerate.</td><td>The re-reform trend continued, but with marked differences between Member States.</td></tr>
<tr><td>Average herd size by specialist and non-specialist dairy farms</td><td>Average herd size was found to grow faster after 2003 for specialist dairy farms. It remained more or less constant for non-specialist dairy farms.</td></tr>
<tr><td colspan="3">Geographical structure of production</td></tr>
<tr><td>Regional/national location of milk production</td><td>It was expected that MS shares will become less fixed as quota limits become less constraining and supply becomes more responsive to price.</td><td>The expected result is found after 2004-2005 in some Member States. No regional bias in these changing shares can be discerned.</td></tr>
<tr><td>Geographical distribution of dairy cows by MS</td><td>It was expected to observe more geographical mobility of productive capacity within MS.</td><td>The expectation is met in some MS, but not in others. No consistent pattern is found for the EU as a whole.</td></tr>
</table>

6 EQ2: Producer prices

To what extent have the CAP measures applicable to the dairy sector affected prices paid to producers, the payment system (links to quantity and/or quality) and price stability.

6.1 Interpretation and comprehension of the key terms of the EQ2

The three key issues in this EQ are the effect of CAP measures applicable to dairy on the producer price for milk (its level), on the payment system for milk and on the stability of producer prices.

The CAP measures that potentially affect price are (a) border measures, which support domestic market prices above world market levels, (b) the target milk price (abolished following Regulation (EC) 1787/2003) and intervention prices (progressively lowered during the period since 2003), (c) private storage aids (also progressively reduced or eliminated), (d) internal consumption aids, which stimulate domestic demand for certain dairy products (also subject to reduction over the period, abolished for butter and cream in 2009)) and (e) quotas on milk supply (deliveries and direct sales) from farms.

The payment system is interpreted as comprising (a) the process whereby the price received by milk producers from purchasers (dairies) is established and (b) the factors that determine the *level* of price paid. IN an operational sense, the payment system is the link between the milk price paid to producers (which is an input cost for dairies) and the prices of processed products (determining the output revenue generated from milk processing by dairies). When price changes in product markets are fully passed back to milk producers (according to the share of milk in the value of the final product), backward *price transmission* is said to be perfect. The price transmission relationship is important in that it determines how effective policy measures applied to dairy product markets are for supporting the milk price, and yet price transmission itself lies outside the scope or control of any policy measure.

CAP measures that can stabilise milk prices in the EU are the intervention system (temporary withdrawal of products from the market) and the permanent disposal measures, export refunds and consumption aids. In each case, it is the *timing* of the use of the measure that is important for price stabilisation, with more supply being taken off the domestic market when prices are falling, and −in the case of intervention− being returned to the market when prices are rising. In theory, the objective of the intervention system was the stabilisation of within-year price and quantity movements caused by seasonality in yields and production systems (which is quite pronounced in some EU regions) or, less typically, to movements from one year to the next due to unusual meteorological variations. Stabilisation measures applied in product markets are effective in stabilising producer prices for milk only to the extent that corrections for instability in product prices are transmitted back up the chain to milk producers.

6.2 Methodology used for answering the EQ2

6.2.1 Level of producer prices

This question is decomposed into two aspects: the impact of CAP dairy policy measures on the absolute level of the producer milk price over time, and the extent to which these measures support the producer prices for milk within the EU above the prices prevailing on world markets.

The switch of some income support out of market price support into direct payments that occurred with the introduction of the dairy premium in 2004 and the phased reduction in the 'floor' prices for intervention products are expected to cause a reduction in market prices beginning in 2004 or soon afterwards, and a continuing downward trend for a few years after that. As long as world market prices remain reasonably stable, this should also be translated into a reduction in price support. However, it should be noted that changes the producer milk price and the price gap between the EU price and the equivalent world market price are affected by other factors apart from policies such as the performance of dairies in valorising milk products (e.g. producing high-value products), which in turn may be partially or fully translated into the producer price for milk.

A straightforward comparison of the levels and trends in milk price before and after 2004 is used to evaluate the impact of policy changes on milk prices. A more elaborate methodology is required to calculate the level and trend in price support relative to world market prices. Raw milk itself is not traded on world markets, and hence there is no directly observable world market price for milk. This is overcome by calculating a composite world market price for the milk content of the basic bulk products, butter and SMP. This calculation is performed for each Member State to produce a 'world milk price equivalent' (WMPE), which is interpreted as the price of the milk content of each Member State's butter and SMP production if these products were remunerated at the world market prices for butter and SMP facing that particular Member State.

Specifically, the WMPE is based on the (FOB) prices world market prices facing Member State i, processing costs of butter and SMP, and the fat and protein content of Member State i's milk production, as follows:

$$WMPE_i = \frac{(P_{but} - PC_{but})}{C_{fat}}(FF_i) + \frac{(P_{SMP} - PC_{SMP})}{C_{prot}}(1 - FF_i) \qquad (1)$$

where: $WMPE_i$: equivalent world market milk price faced by Member State i

P_{but} : FOB world market price of butter

P_{SMP} : FOB world market price of SMP

PC_{but} : processing costs butter

PC_{SMP} : processing costs SMP

C_{fat} : quantity of fat necessary to produce 1 kg of butter

C_{prot} : quantity of skimmed milk needed to produce 1 kg of SMP

FF_i : fat percentage of raw milk produced in Member State I (Eurostat, see Table 2.17)

The processing costs for butter and SMP are taken as €29.31/100 kg and €28.34/100 kg, respectively, and the quantities of fat to produce 1kg of butter and of skimmed milk to produce 1kg of SMP are taken as 0.8374(kg) and 11(kg), based on estimates of DG AGRI (2011) and of the Dutch Dairy Board (Produktschap Zuivel, 2011). The world market prices for the calculation are the Oceania FOB export price of butter (82% butterfat) and the non-fat dry milk (1.25% butterfat) (see Table 2.17).

The milk price equivalent based on actual EU market prices for butter and SMP in each Member State ('producer milk price equivalent', or PMPE) is calculated using formula (1) after substituting EU Member States prices for butter and SMP (Tables 2.20 and 2.24 respectively). In addition, the (effective) intervention[40] milk price equivalent (IMPE) is calculated following a formula similar to (1), but using 'effective' intervention prices for butter and SMP rather than market prices.

[40] For butter, the effective intervention price is set at 90% of the official intervention price and is based on the effective quantity and quality of each product that qualified for intervention purchasing. For SMP, it equals the official intervention price in each period.

The difference between the PMPE in a given Member State and its WMPE then provides a measure of the price support (P-SUP) of EU policy to dairy farmers for that Member State. P-SUP will be an over- or under-estimate of the rate of price support depending on whether the price gap between domestic and world market prices for higher-valued products (e.g. cheese and WMP) is larger or smaller than that of the bulk products butter and SMP. However, if the prices of all these products move more or less in parallel, then changes in the P-SUP ratio should capture changes in total price support. Note that P-SUP is Member State-specific and year-specific (with time subscript left out for convenience). The formula, for the i-th Member State, is given as

$$P - SUP_i = \frac{(PMPE_i - WMPE_i)}{WMPE_i} \quad . \qquad (2)$$

If P-SUP is greater than zero, then the CAP measures provide positive support to the milk price. For example, if $P\text{-}SUP_i=0.25$, then the CAP supports the price of the milk used for basic products of the i-th Member State at a level that is 25% above the equivalent world market price level, and when $P\text{-}SUP_i=0$, then policies do not create any difference between the price of the milk used in the Member State for butter and SMP production and its equivalent price on world markets. Other factors, such as transport and handling costs from the location of measurement in the Member State to the nearest port for export or import could lead to a non-zero P-SUP ratio, even when the effective support provided by the policy is zero. This component is expected to be relatively minor, however, and constant over time, in which case *changes* in P-SUP over time can be interpreted as very largely due to changing policy impacts.

The approach assumes that the underlying behaviour of farmers and processors, processing costs, and yield coefficients, remain unchanged over time. Furthermore, it is assumed that the quantities and prices of higher-value dairy products move proportionately with those for basic prices, and that world market prices are not sensitive to changing policy impacts on EU dairy product markets.

6.2.2 Payment system

Since most of the EU dairy policy measures directly target the prices and/or markets of milk products rather than the producer price for milk, understanding the payment system is important for gaining insight into how prices are formed at the first link in the supply chain and, specifically, the degree of price transmission from product markets back to the market for raw milk. Information on this issue is based on three sources:

- Information on the typical structure of the payment system (factual information) from the case studies (milk producer and dairy processor surveys);
- Information on whether, and if so how, the payment system was perceived to have changed due to policy changes from the case studies;
- Literature research on price transmission (often based on econometric analysis of time series of prices).

Information about the payment system is often considered by the dairies to be sensitive information. Although some dairies report information on the general principles according to which they price the raw milk they collect, how the system actually works in practice cannot necessarily be inferred from these general principles.

6.2.3 Price volatility

The effects of the CAP measures on price stability are analysed by comparing volatility indicators for monthly prices. When comparing volatility between Member States, the producer milk price is used. However, when comparing volatility between the EU milk price and the world milk price, the comparison is between the PMPE and the monthly world market milk price equivalent (WMPE). This is because, as raw milk is hardly traded on the world market, there is no 'world milk price' as such.

No single indicator is universally used as a measure of volatility. Two approaches are offered here, in order to appeal to both a non-technical and technical readership:

- non-technical analysis-measures such as the trend and ±10% band indicators (graphical analysis of variability), and
- technical measures, i.e. specific statistics measuring variability in price series.

Variation from trend or price-band analysis: This non-technical method involves calculating a ±10% band around the trend line and counting the share of observations within and outside this band (Keane and O'Connor, 2009). The number of outlying observations since January 2004 is compared with the number during the period of similar duration up to December 2003. Note that a wider or narrower band width could be chosen. The appropriate width of the band outside which an observed price is considered an 'extreme' observation depends on the extent of variability of the series in the pre-2004 period.

Statistical measures: we select two alternative statistics for measuring volatility: the coefficient of variation, and the annualised standard deviation.

***Coefficient of variation*:** The standard deviation (SD) of a variable measures the extent to which the variable fluctuates around its mean. However, it is a poor measure of volatility between variables when they do not have a common mean. In these circumstances, one must standardise the SD in relation to its mean, and this produces the *coefficient of variation* (CV) for the variable. The CV expresses the SD as a percentage of the mean, and is calculated as follows:

$CV = \frac{SD}{\overline{x}} \times 100$, where SD is the standard deviation and $\overline{x}$ is the mean.

***Annualised standard deviation*:** This statistic is commonly used to compute historic volatility (O'Connor and Keane, 2011). The annualised standard deviation (ASD) is the standard deviation of the logarithm of price multiplied by the square root of the number of measurement periods per year (which in this case is 12, as monthly data are used). Converting the prices to logarithmic form allows variability to be measured as a percentage of the (geometric) mean. This solves the problem of non-comparability noted above for the SD of price levels. The ASD is given as follows:

$$ASD(p_1,\ldots,p_n) = SD(p_1,\ldots,p_n) \times \sqrt{12} \qquad (3)$$

where $p_1,\ldots,p_n$ is a price series in logarithmic form, extending over *n* periods.

To the extent that data availability allows, the volatility analysis is done at Member State level. When and where price information from key dairies is available, this information has also been used to do some cross validation and check on the calculations based on average producer price for milk at MS level. As regards the time horizon, the seven-year period before the Luxembourg Agreement 2003 and several shorter periods thereafter are considered and compared.

In addition to the analyses described above, this EQ reports information from the milk producers' and the dairy processors' survey regarding the impact of volatility. Milk producers were asked to assess how increased price volatility had affected their willingness to remain in dairying or their decision to leave. Processors were asked about the extent to which higher price volatility had led them to adjust their payment system and their contracts with other segments of the supply chain. The aim of these questions was to gain insight into the impacts of price volatility on dairy processors and dairy farms, on the extent to which they can cope with volatility, and their reactions to it.

6.3 Judgement criteria, indicators and information sources used for each indicator

Table 6.1 lists the indicators used to address this evaluation question, their data requirements and the sources of these data.

Table 6.1 Indicators, data requirements and information sources for EQ2

Indicator	Data requirements	Information sources
Price support		
Producer price for milk	Farm-gate milk prices	Eurostat
Price support	MS prices of butter and SMP, prices, Milk fat content, World market prices for butter and SMP, Estimated processing costs for butter and SMP, quantity of fat to produce 1kg of butter, quantity of skimmed milk to produce 1kg of SMP	Eurostat ZMP, and national statistics Eurostat European Commission, Productschap Zuivel (Netherlands)
Payment system		
Perceptions of milk producers and processors regarding the impact of policy changes on the payment system	Survey responses	Milk producer and milk processor surveys
Evidence on price transmission at first link in the dairy supply chain	Econometric evidence	Commission Staff Working Document SEC (2009) 1450
Price stability		
Comparison of measured price volatility for the period before and after 2003, based on: • price band indicators (graphical analysis of variability) • coefficient of variation • annualised standard deviation	Same series as used above.	Idem

The following judgement criteria are used:

- the level and the trend in producer milk price are both examined and in each case compared for the periods before and after 2003. In particular, it is expected to find a decline in the milk price starting in 2004 when some income support was shifted about of market price support into the dairy premium. If this is found, it would indicate the expected impact of policy changes on price.
- the level and the trend (if any) in P-SUP (measured per year) are both measured and compared for the years before 2003 and during the period in which the 2003 reforms were applied. If the level remains more or less constant on average across the two periods, or if pre-2003 trend is maintained post-2003, then this implies that the changes in CAP measures have not affected the degree of underlying price support. Given the expectation that policy lowered the milk price from 2004 onwards, price support is also expected to be lower also, providing world market price conditions remain stable. However, if world market prices are also changing, then this affects the measured gap between domestic and world market equivalent milk price, and may mask the effect of lower price. If price support remains constant while domestic price falls, this would mean that world market prices were also falling.

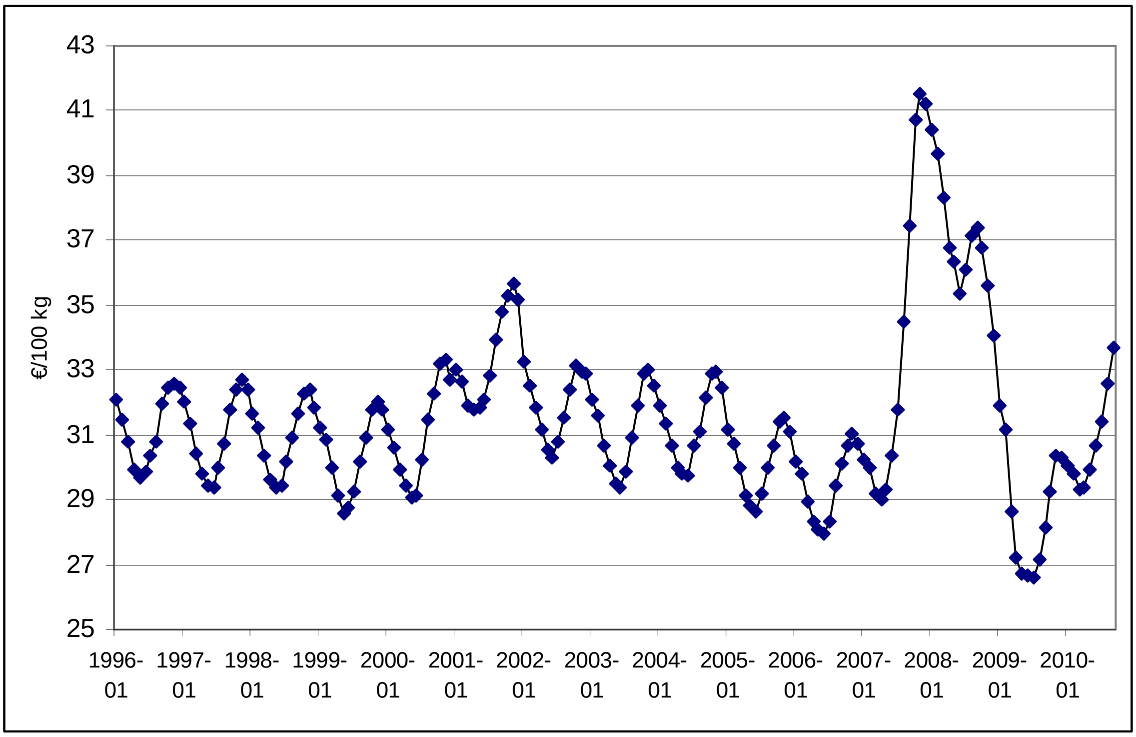
- the payment system is not a direct policy target. However, policy changes may provide incentives for processors to adapt their payment systems. The survey evidence will be taken as decisive here providing it can be backed up by theoretical reasoning and other, related empirical evidence.
- the price volatility indicators will be used to reach a judgement on whether (a) observed volatility in the milk price increased in the period, and sub-periods, after 2003 relative to the period before these changes, and how these differences were distributed among the Member States, and whether (b) the degree of stability of the EU internal milk price relative to the world market price decreased after the policy changes that are evaluated in this report. This is expected to be the case, since the 2003 and subsequent legislation, as well as market management decisions, implied less vigorous use of export subsidies and the scaling down or phasing out of internal stabilisation measures.

6.4 Impact of policy changes on milk price

6.4.1 Price trends

Figure 6.1 shows the pattern of the monthly producer price for milk in the EU-15 countries between January 1996 and December 2010. For most of the period, there is a marked seasonal pattern. However, it is clear that between 1996 and the beginning of 2005 (and with the exception of the two seasons 2001/2, and 2002/3), the seasonal fluctuation was between 29 and 33 cents per kg. Starting during 2004 and for the two seasons 2005/6 and 2006/7, however, this pattern shifted downwards, so that the (smaller) fluctuation was contained between (approximately) 28 and 31 cents per kg. This indicates the impact on price of shifting income support out of market price support and into the dairy premium, of the lower intervention prices for butter and SMP, and lower levels of disposal aids and export refunds. Nevertheless, for EU-15 as a whole, the fall in the average raw milk price is less than the fall in intervention prices. From mid-2007 onwards, the pattern in milk prices is completely masked by the strong price fluctuations that characterised agricultural commodity prices worldwide, including those for dairy products.

Figure 6.1 Monthly producer price for milk, EU-15, €/100kg, 1996(1)-2010(12)



Source: Eurostat.

The strong and atypical price volatility, which affected dairy markets worldwide between 2007 and 2009, over-rides the underlying downward shift in milk price after 2007. This is underlined by the sub-period averages in Table 6.2. The average EU-15 raw milk price (€30.32/100kg) was more than €1/100kg lower in 2004-2005 than in 1997-2003, and rose to above €35/100kg in 2007-2008. After the high prices of 2007-2008, milk prices fell very steeply, beginning in late 2008 and reaching unusually low levels in mid-2009. In 2009, the average EU-15 raw milk price was under €27/100kg for the months of May, June, and July, whereas the average EU-27 price fell below €25/100kg in June and July.

Table 6.2 shows that there is considerable heterogeneity between Member States regarding raw milk price. A few EU-15 Member States have a higher average for 2004-2006 than in 1997-2003, although for the majority of them it is lower. Even during the market disruptions of 2007-2010, the same heterogeneity is observed. The steepest price falls (between the average for 2007-2008 and the average for 2009-2010) are observed in Luxembourg, Ireland, Spain, Hungary and Belgium, where the difference between the averages for the two periods is greater than €6.50/100kg. In 2009-2010, average raw milk prices fell back to a level lower than the average for 1997-2003, whilst for others it remained higher.

In the Member States of EU-10, the change on accession is an upward shift for six of the countries shown, but a fall for three others (Cyprus is not included). However, they all experience a higher price in 2007-2008 but by less than the other EU Member States.

There is little evidence in Table 6.2 of convergence between milk prices in EU-15 Member States over the period. The range (between the lowest and highest MS price) is wider in 2009-2010 than in 1997-2003 in EU-15, but smaller in EU-10 (for the countries shown) than in 2003.

Table 6.2 Annual average milk price by Member State, four sub-periods, €/100kg

EU-15	1997-2003	2004-2006	2007-2008	2009-2010	EU-10	2003	2004-2006	2007-2008	2009-2010
BE	29.65	27.83	33.33	26.47	CZ	23.83	26.20	31.21	24.94
DK	33.24	29.56	34.41	29.12	EE	18.51	24.56	28.29	23.85
DE	30.96	28.28	33.07	26.69	HU	27.39	24.66	30.37	23.28
EL	32.69	35.62	40.94	37.37	LT	13.93	19.02	24.90	21.00
ES	28.34	30.24	36.64	29.11	LV	13.52	20.71	27.01	21.39
FR	30.46	30.53	33.92	30.21	MT	41.28	24.97	*	*
IE	27.85	28.17	35.24	27.26	PL	15.87	23.19	29.93	24.29
IT	36.11	33.61	35.88	31.91	SK	21.53	24.17	30.67	23.57
LU	32.88	31.19	36.86	27.92	SI	29.43	27.00	30.50	26.16
NL	32.10	28.64	34.37	28.52	**EU-10**	**24.20**	**26.32**	**29.11**	**23.56**
AT	29.93	29.68	36.40	29.97	**EU-02**				
PT	30.72	29.78	33.99	28.59	BG	30.86	26.20	31.21	27.44
FI	33.82	35.28	41.65	38.09	RO	29.43	24.56	28.29	26.24
SE	34.07	30.08	33.63	29.00					
UK	27.89	26.35	30.48	26.60					
EU-15	**31.58**	**30.32**	**35.39**	**29.79**					

Notes: * Average not shown because the series is incomplete.
Source: Eurostat.

6.4.2 Price support (P-SUP): Levels and trends

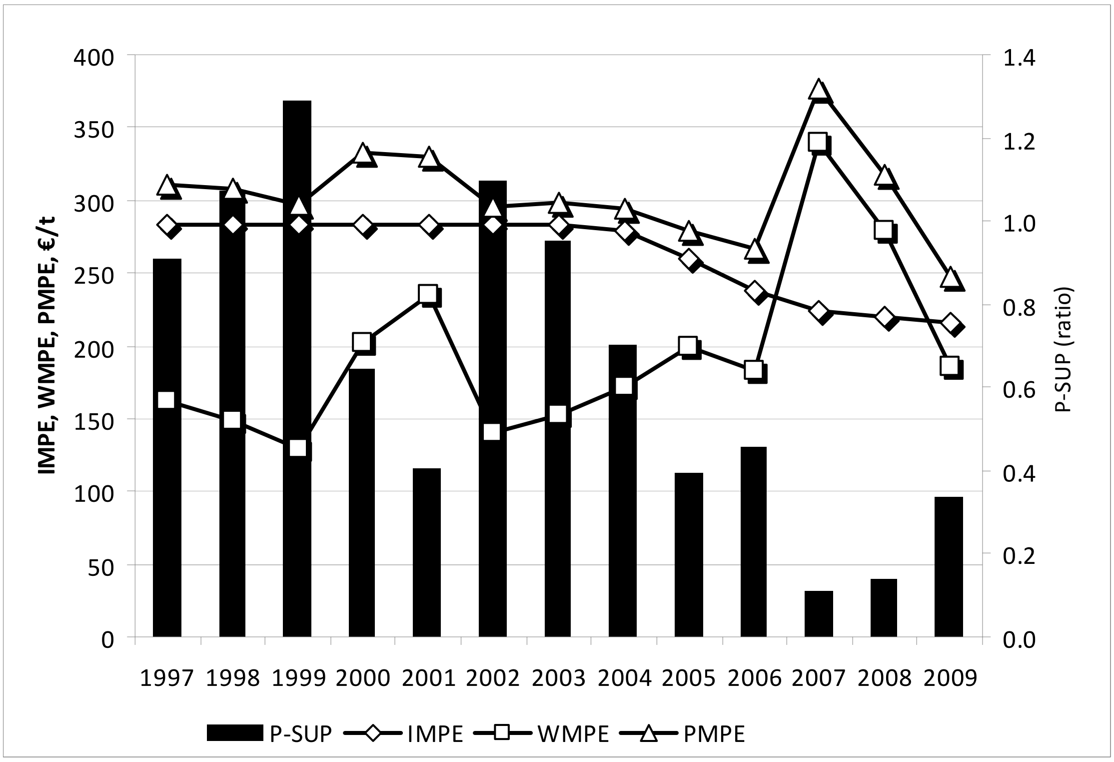
As the IMPE is determined by the effective EU intervention prices, the IMPE during the period 1997-2003 was quite steady at around €283/t milk (Figure 6.2). However, from 2004 onwards, the IMPE began to decline, and by 2009 it was about €216/t, 22% below the level of the pre-2004 period.

In the first sub-period, the producer milk price equivalent (PMPE) based on butter and SMP prices was 4-9% above the IMPE, depending on the year, except in 2001 and 2002 when it stood at 16-17% above the IMPE. From 2004 onwards, the relative difference between the PMPE and the IMPE became consistently greater, reaching 68% above the IMPE in 2007 but then falling to 44% in 2008 and 14% in 2009. This indicates that intervention prices were playing an increasingly minor role in setting the level for producer bulk product prices, and that market forces (and especially those that caused the price spike in 2008) were much more important.

From 1997-2003, there is a weak influence of world price on PMPE, but from 2003 to 2006 the effects of reform mask this influence. The IMPE (EU) was between 40% and 120 % higher than the WMPE (world) in the pre-2004 period; however, from a position of 62% higher in 2004, the IMPE fell relative to the WMPE, and in fact in 2007 and 2008, it was 34% and 21% *lower* than the WMPE, respectively. In 2009, it was just 17% higher.

The P-SUP ratio shows the net impact of these independent movements on the effective price support for milk used for bulk products within the EU above the world market equivalent price. Not surprisingly, there is considerable annual variation. However, it is noticeable that whereas this ratio exceeded 1 in two years during the 1997-2003 period, indicating that milk price was more than double world market equivalent price, from 2004 onwards this level was never again reached, and in the last five years, P-SUP was 50% or far less of the WMPE. In 2007 and 2008, P-SUP was very low and the internal EU milk price equivalent moved in parallel with the world market equivalent, as policy measures for managing internal prices were rendered ineffective by the negative price gap between IMPE and WMPE.

Figure 6.2 Evolution of price support and milk price equivalents in EU-27



Note: PMPE is the domestic price of milk as used for butter and SMP; IMPE is the intervention milk price equivalent; WMPE is the world milk price equivalent based on (FOB) world market prices for butter and SMP.

Source: own calculations.

Table 6.3 EU and world market prices, EU price support, averages for sub-periods of 1997-2009

	1997-2003	2004-2006	Change relative to 1997-2003	2007-2008	Change relative to 1997-2003	2009	Change relative to 1997-2003
	€/t	€/t	%	€/t	%	€/t	%
IMPE	283.24	258.59	-8.7	222.38	-21.5	216.15	-23.7
WMPE	167.29	184.93	10.5	309.02	84.7	184.89	10.5
PMPE	310.09	279.54	-9.9	347.41	12.0	247.31	-20.2
P-SUP	0.91	0.52	-43.0	0.13	-86.2	0.34	-62.9

Source: own calculations.

There are sharp year-to-year movements in some of the statistics shown in Figure 6.2. The four sub-period averages shown in Table 6.3 smooth these fluctuations in order to summarise the general level of these different variables in the years before and after the reduction in intervention prices and the introduction of direct payments for milk. The summary shows clearly that in 2004-2006 policies provided a much lower floor price for milk via the intervention mechanism, and that producer milk prices (PMPE) on average fell by slightly more (-9.7%) in relative terms than the IMPE (-8.7%). During 2007-2008, the PMPE cut loose from the IMPE and rose to a higher average level than in 1997-2003. By 2009-2010, however, it had fallen –relative to its pre-2004 average– by nearly as much as the IMPE.

Table 6.4 shows the calculated P-SUP at Member State level. This ratio denotes the degree of support given to the price of milk for bulk products, as a fraction of the equivalent world market price of milk for bulk products. Although there are some marked differences between Member States and between years for the same Member State, which we do not attempt to explain here, it is clear that the pattern at EU level (namely, much lower effective price support from 2004 onwards) is repeated at Member State level. In fact, in 2008 the P-SUP ratio was negative for Ireland, the Netherlands and Slovakia.

Table 6.4 Price support indicator (P-SUP) for the EU-27

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	0.49	1.13	0.95	0.70	0.44				
Belgium	0.38	1.02	0.90	0.68	0.36	0.49	0.20	0.06	0.32
Denmark	0.53	1.35	1.18	0.91	0.58	0.63	0.15	0.29	0.43
Finland	0.36	0.96	0.83	0.61	0.34				
France	0.35	0.98	0.86	0.66	0.36	0.46	0.19	0.00	0.26
Germany	0.42	1.04	0.91	0.68	0.37	0.50	0.22	0.05	0.24
Greece									
Ireland	0.23	0.92	0.80	0.57	0.27	0.34	0.08	-0.06	0.18
Italy									
Luxembourg									
Netherlands	0.37	1.03	0.90	0.68	0.35	0.48	0.19	-0.02	0.27
Portugal			0.72						
Spain	0.39	1.02	0.77	0.62	0.36				
Sweden	0.38	1.33	1.14						
United Kingdom	0.53	1.12	0.93	0.73	0.42	0.44	0.12	0.11	0.22
Cyprus									
Czech Rep.				0.57	0.34	0.40	0.02	0.06	0.18
Estonia				0.47	0.24				
Hungary				0.47	0.31	0.32	-0.15	0.17	0.17
Latvia				0.47	0.30	0.47	0.11	0.42	0.53
Lithuania				0.34	0.32				
Malta									
Poland				0.42	0.26	0.38	0.07	-0.03	0.18
Slovakia				0.47	0.36	0.48	0.12	0.28	0.57
Slovenia				1.25	0.96				
Bulgaria									
Romania									
EU-27	0.40	1.10	0.94	0.70	0.40	0.46	0.11	0.14	0.34

Notes: An empty cell means that not all data were available for performing the calculation.

Source: own calculations.

6.5 Information on the payment system

There is no standardised payment system across the EU. The way milk price is determined differs from one Member State to another, and between the two main types of processing company (cooperatives and private companies). However, the underlying principles are more or less the same in all systems. There is a basic price, which depends on a standard fat and protein content. This price is then adjusted according to:

- composition (actual fat and protein content),
- hygienic quality
- other quality criteria.

Fat and protein content are the dominant criteria (hence the name 'component pricing'), as they are decisive for the yield of the milk in terms of the processed product. However, other criteria that affect the value-adding process or contribute to cost savings for the dairy are also subject to special bonuses, including the milk's freezing point, bacteria and somatic cell counts, seasonality, large-volume deliveries, guarantee to be from dairy cows grazing out of doors and organic production.

Thus, the payment system acts as a powerful set of incentives for producers, encouraging them to supply milk of the desired composition and quality, and at the times of the year that maximise the return to the milk when it is sold on by processors in the form of dairy products. Most of these criteria are cost- or consumer-oriented, and not directly affected by policy. An important exception is the return to fat and protein themselves, which will depend (a) on the extent that butter and skim milk powder prices are supported by export refunds and (b) the extent to which their price movements are smoothed by intervention buying and selling. Moreover, (c) the *relative* incentives to produce fat rather than protein will also be influenced by the management of export refunds and the extent of intervention for these two basic products relative to each other. The other incentive criteria for adjusting milk prices are more dependent on market signals and cost-reducing potential.

There are differences in the payment system between cooperatives and private dairies. The price paid by the latter is the result of contractual negotiations between the individual milk producer or producer organisation. It is difficult to obtain comprehensive empirical information on how much of the net value added of the milk is captured by the primary producer in these negotiations. It depends very much on the relative bargaining strengths of the two 'sides' of the market, and anecdotal evidence suggests that this varies from country to country, and between dairies in the same country. In fact, unequal bargaining power may be a very localised phenomenon, where one dairy is effectively the only downstream outlet for a geographically determined group of producers. By contrast, milk producers delivering to a cooperative have to be members of the cooperative, and the price paid depends on the economic success of the cooperative. In theory, all the cooperative's net value added is paid out to members. However, cooperatives are obliged to collect all the milk offered by their members, whereas private dairies do not have this obligation and instead they collect milk on a negotiated basis. This allows private firms more flexibility as compared to cooperatives to adjust their milk intake as a function of their marketing opportunities. Without this flexibility, cooperatives face higher risks compared to private dairies. In addition, there is evidence in some countries that private companies are more innovative in product design and have a more market-oriented product mix, so it is by no means a foregone conclusion that cooperatives always pay higher milk prices than private companies.[41]

Market intervention is targeted to processed dairy products (butter and SMP) rather than to raw milk. However, the range of dairy products determining the remuneration of milk fat and milk protein is much wider than butter and SMP. The product mix usually also includes various high-value products (for example, PDO/PGI cheeses and fresh dairy products) and the composition of the product mix is likely to vary over Member States. The degree of self-sufficiency in the different derived dairy products and the shares of the products going to domestic and foreign or export markets also play a role in determining the level of the domestic prices.

[41] This is confirmed by the annual International Milk Price Comparison (prices paid by individual milk processing entities) by LTO in the Netherlands.

None of the policy measures applied to the dairy sector target the bargaining process between milk producer and processor at this first link of the chain. So, although the measures already mentioned can influence the price of fat *relative* to protein, and even the absolute prices of these components that the dairies receive for them, these policy measures do *not* have any leverage over the share of these prices that is passed back to the milk producer. Moreover, less restrictive quota limits are thought to have weakened producers' bargaining power.

Good price transmission from processors to milk producers is a necessary condition for the payment system to act an effective conduit for policy impacts to producers. Vertical price transmission involves passing price shocks along the chain from primary producer to wholesale to retail levels, and vice versa. The European Commission (2009b) analysed price transmission in several EU Member States (Austria, Denmark, France, Germany, and Slovenia) and for several dairy products (among which drinking milk, cheese, yogurts, butter). The study concluded that price transmission between producer and *consumer* prices is weak (with price transmission coefficients for most countries and products well below 1) and asymmetric (price rises more fully and more speedily passed forward down the chain than price falls, and the reverse for backward transmission). However, this evidence relates to transmission between the markets at each end of the chain, and does not necessarily hold for each link in the chain. There is some evidence that vertical transmission between dairy *wholesale* prices and producer milk prices may be more effective in some countries. For example, O'Connor (2006) found clear evidence of price transmission between the composite product price series and the farm gate price for milk. However, European Commission (2009b) reports that there has been a clear trend lately towards an increase in the level of gross margins at processing level for some dairy products in some countries (e.g. UHT milk and yogurt in France, and liquid milk and butter in Denmark). Milk prices are well documented, and retail dairy prices are also collected but less systematically. However, wholesale prices for dairy products are hard to observe and are not collected on a regular basis. This hampers the conduct of a rigorous statistical analysis of price transmission between intermediate stages in the chain.

Table 6.5 summarises the main characteristics of the payment systems reported by the survey respondents in the selected Member States where case studies were conducted. In all case, the fat and protein components of the milk help to determine its price. This implies that, *ceteris paribus*, changes in the prices for fat and protein, which are implicit in the prices of derived dairy products such as butter (fat), SMP (protein), and cheese (fat and protein) should via the payment system induce changes in the price of raw milk. Moreover, as already stressed above, market measures targeting the prices of butter and SMP will potentially indirectly influence the milk price. As also stressed, the extent to which this occurs depends on the relative bargaining strengths of milk producers and milk processors.

The evaluation question asks whether CAP measures have influenced the payment system regarding links between price and the quantity of milk produced. The answer is negative. A preoccupation of CAP dairy policy has been the need to achieve market balance by *limiting* supply, yet the payment system in many countries rewards producers for *larger* deliveries because this reduces collection and testing costs. Incidentally, this premium, which is motivated by the aim of dairies to reduce costs, provides an incentive for structural change in the milk producing sector, which as explained earlier in the report, *is* a policy objective. Thus, there is a positive impact from a market-motivated feature of the payment system on a policy objective.

The evidence from the surveys on whether the changes in dairy policy since 2003 provoked changes in payment systems can be broken down into two parts. Milk processors were asked this question directly, and the answers were almost unanimously negative. The second type of evidence concerns whether the production decisions of milk producers are in fact influenced by the payment system. A few respondents said they were influenced by environmental or quality incentives, but there was no evidence that producers' decisions were influenced by the elements of the price system that might theoretically (according to the discussion above) be responsive to policy changes. Thus, if policy changes have not had an impact on the payment system, and if in any case features of the payment system do not for the most part influence milk producers' decisions, then there can be no causality via this link between policy changes and the performance of the milk-producing sector.

Table 6.5 Selected characteristics of pricing for raw milk (apart from fat and protein) in selected Member States

Country	Characteristics
Austria	• Premia for special qualities or other criteria like large milk deliveries or low bacteria. • Prices depend on the quality of milk delivered, the financial situation of the respective dairies and the costs of collecting milk
Germany	• Additional premiums for special qualities (S-class, GMO-free etc.), larger delivered quantities and longer delivery intervals • Four different pricing practices exist: o Utilisation system: producer prices are calculated according to the gross utilisation of the processed milk (very common for cooperatives) o Reference price system: producer prices are based on the average milk prices paid by other dairies in the same region (common in southern Germany) o Negotiation system: producer prices are freely negotiated between the dairy and the milk producer or the milk producer association (only for private dairy companies) o Spot market (not common)
Italy	• Milk price in Lombardy is considered the reference price for Italy • The prices are influenced by the cheese market and in particular by PDO/PGI cheese (for which milk production has to fulfil special criteria) • Agreements are reached on the trend in prices (this is linked to the ripening period of the cheese) • Additional premiums from dairies are paid based on volume of delivered milk
Ireland	• Different prices for manufacturing and liquid milk (whole year fresh milk products) • About 90% is paid as manufacturing milk
France	• Milk prices depend on collective rules defined at a regional level (Centre Régional Interprofessionel de l'Economie laitière, CRIEL) and the national level (by the Centre National Interprofessionel de l'Economie Laitière, CNIEL). • the CNIEL makes recommendations for the basic price to CRIEL based on indicators of trends in dairy markets. In the future (decree December 2010), the CNIEL indicators could serve as references for determining the basic contractual milk price. • dairies grant premiums to encourage producers to supply milk with certain specific qualities (in relation to industrial needs).
The Netherlands	• The milk price paid consists of a guaranteed price and a performance premium: o The guaranteed price is based on a weighted average of milk price paid by other dairy companies in the Netherlands and neighbouring countries. o The performance premium is dependent from the profit.
Poland	• Special premiums by dairies for: regular quality controls (regular controls of milk parameters and cow yields, being certified by external organisation), longer delivery terms, cooling milk or having contract with processor • Use of endless contracts with 3 months renunciation period
Spain	• Special premiums by dairies for: deliveries of higher volumes, fidelity • Lack of written contracts between farmers and dairies • Pricing in spot market limited
United Kingdom	• Additional premiums for larger deliveries of milk and longer delivery intervals • Many UK dairies manage their own milk pools, fewer and fewer rely on milk brokers to supply their milk, and those that do are trying to reduce this dependency. This is putting considerable pressure on those businesses that still act as milk brokers • Milk price schedules are detailed and demanding. They spell out quality issues in some detail, together with collection responsibilities, insurance requirements, etc.

Notes: In *all* Member States shown, price is also based on fat and protein content. To avoid repetition, this feature is not explicitly included in the table.

Source: Case Studies.

6.6 Price volatility

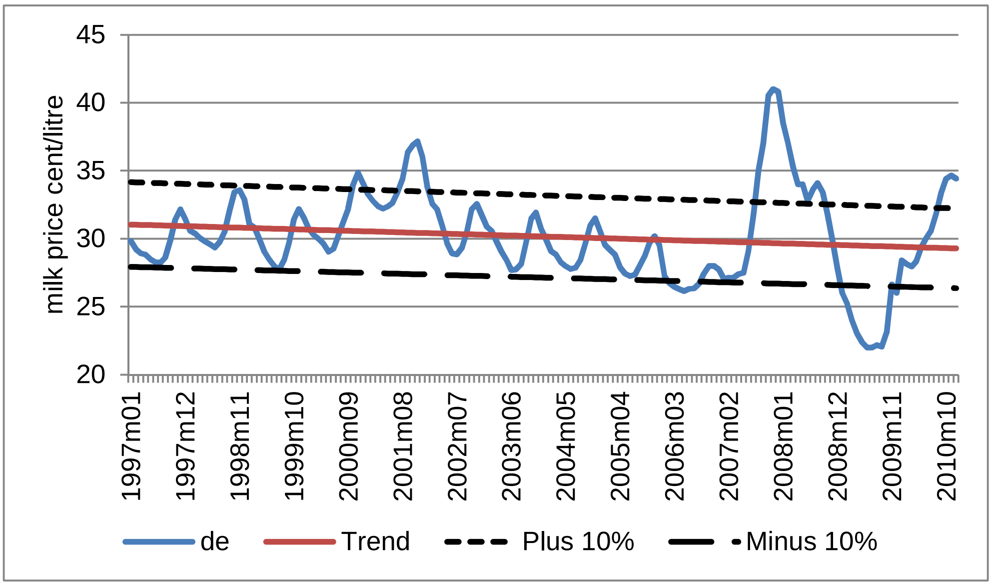
The questions addressed in this section are (a) whether observed volatility in the milk price increased in the period after 2003 relative to the period before these changes, and how these differences were distributed among the Member States, and (b) whether the degree of stability of the EU internal milk price relative to the world market price decreased after the policy changes that are evaluated in this report.

First, several different indicators are used to assess what happened to price stability in the evaluation period, which starts at 2003, as compared to a period of similar length before 2003.

6.6.1 Statistical analysis

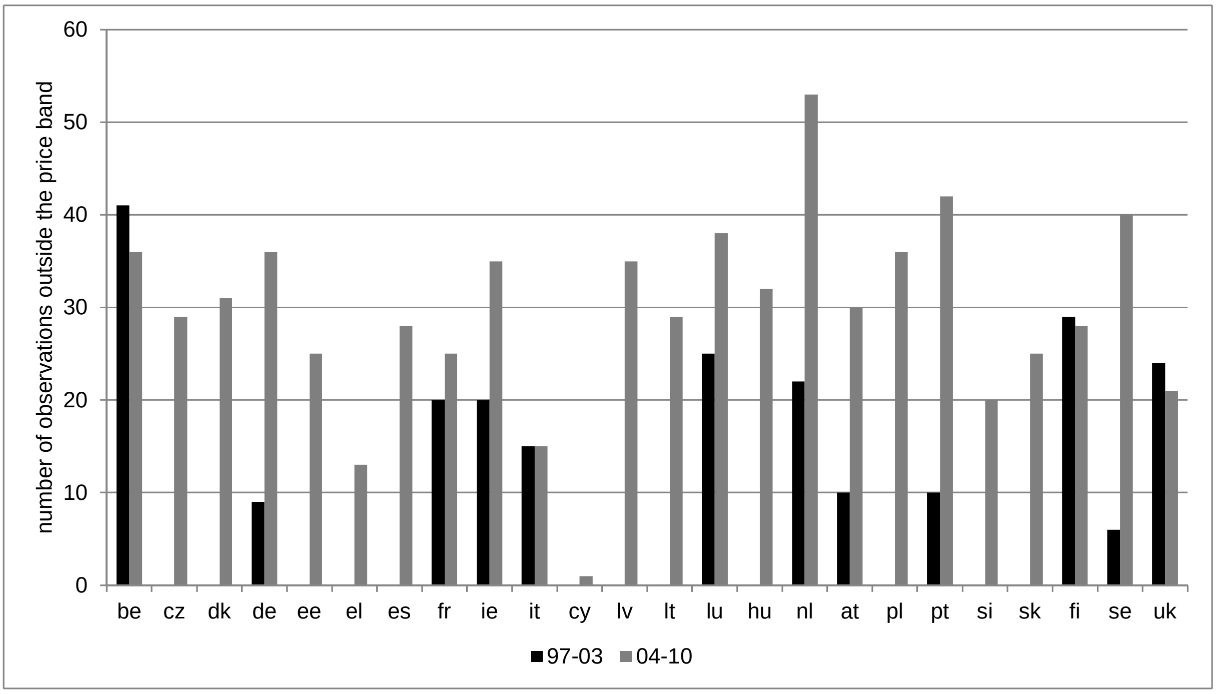
First, we illustrate the price-band methodology, taking Germany as an example. This methodology is then applied to all Member States in order to compare the pre- and post-2003 periods. For monthly German data on the producer price for milk, the underlying trend is presented and a price band of ±10% relative to this trend evolution is drawn. The number of times price falls outside this band, relative to the total number of observations, is an indicator of the extent of 'extreme' price variation.

Figure 6.3 Price-band analysis for Germany



Source: own calculations.

Figure 6.4 Results of price-band analysis by sub period for all Member States



Notes: 1) The width of the price-band around trend is ± 10%.

2) Data for EU-10 are available only for the second period. For Denmark, Greece and Spain, data were available for the first period but there were no values outside the bands, indicating price stability within the ±10% bounds in these countries in the earlier period.

3) Nominal prices are used (where necessary, conversion to euros used the contemporaneous exchange rate).

Source: own calculations.

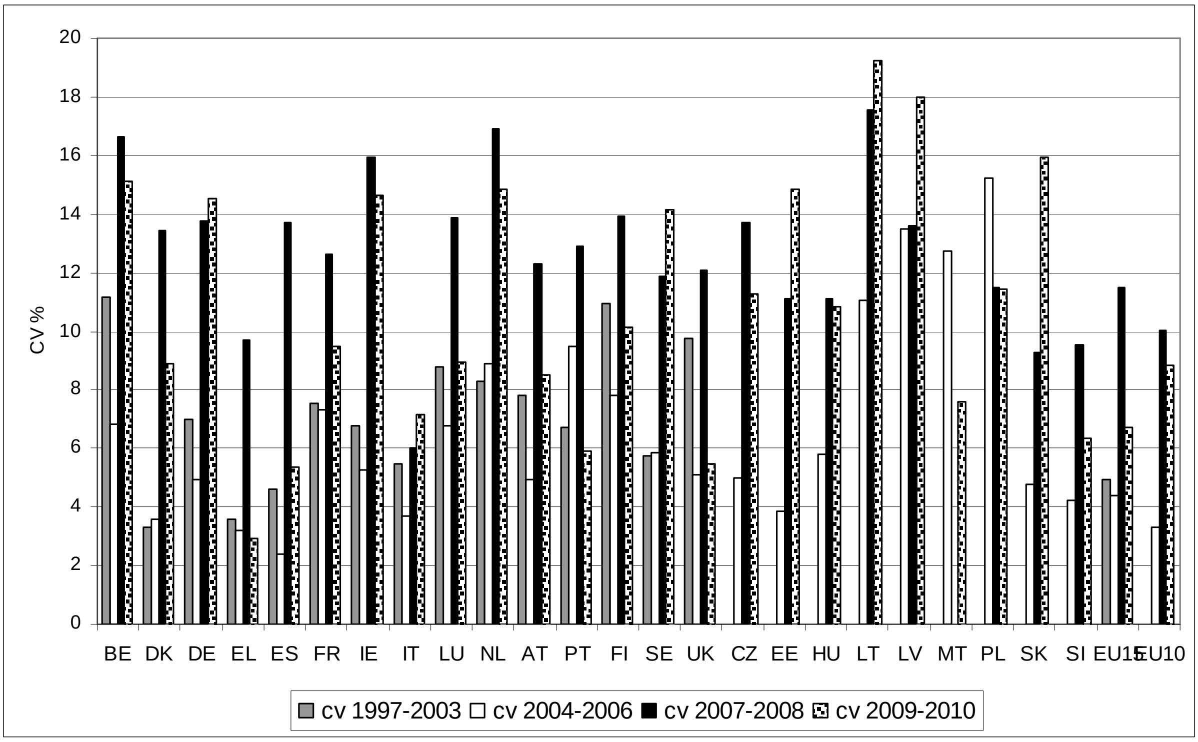
Figure 6.3 shows the estimated trend line for Germany for 1997-2010 (central solid line). The higher (dotted) line shows the long-run trend value plus 10%, and the lower (broken) line gives the long-run trend value minus 10%. There are 9 observations outside the ±10% band between 1997-2003, and 36 observations outside between 2004-2010, clearly illustrating a major increase in producer price volatility in Germany between the two sub-periods.

The results of applying this analysis to all Member States are presented in Figure 6.4. It is apparent that there has been wide variation between countries in terms of change in volatility between the two periods. A large majority of countries showed very substantial increases in volatility, e.g. Germany, Netherlands, Sweden; however, there were also exceptions, in particular, Belgium, Finland, Italy and the UK.

6.6.2 Coefficient of variation (CV) for producer milk prices

Figure 6.5 reports the coefficients of variation of monthly producer prices for milk at Member State level for four sub-periods.

Figure 6.5 Coefficient of Variation, EU-15 and EU-10



Source: own calculations.

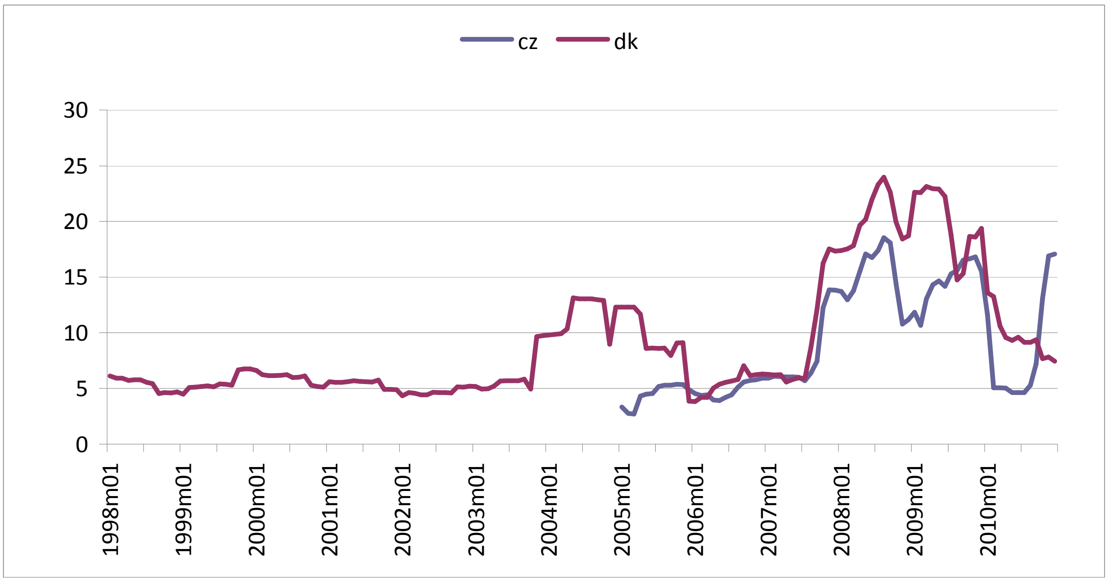
For all EU-15 Member States except Sweden, the coefficient of variation is highest in the period 2007-2008. In Italy, volatility as measured by the CV is only 10% higher in 2007-2008 than in the period 1997-2003. By contrast, it is more than 4 times as high in Denmark. For the EU-15 average price, the CV is 130% higher in 2007-2008 than in 1997-2003, and 10% lower in 2004-2006. Eleven of the EU-15 Member States had lower volatility in 2004-2006 than in the previous seven-year period.

The pattern in the Member States of EU-10 is a little different, with four Member States having volatility as high or higher in the 2009-2010 period, than in the previous period. The coefficients of variation for Poland, Latvia and Lithuania are among the highest for one of the sub-periods after the reform, along with those for Belgium, Ireland and the Netherlands.

6.6.3 Annualised Standard Deviation

Figure 6.6 illustrates the annualised standard deviation methodology by applying it to price data for Denmark and the Czech Republic. These two Member States are chosen as typical examples. The absence of data for the earlier period explains the truncated nature of the Czech series. There is clearly greater volatility in the later part of the second sub-period, although for Denmark an episode of less extreme volatility also occurs during 2004.

Figure 6.6 Annualised Standard Deviation (Denmark and Czech Republic)



Source: own calculations.

Table 6.6 Mean Annualised Standard Deviation, countries of EU-25

	1998-2004	2005-2010	% change
Belgium	19.9	14.3	-28.2
Czech Republic		9.2	
Denmark	6.4	12.4	93.9
Germany	10.1	12.1	20.2
Estonia		9.5	
Greece	3.8	6.8	78.2
Spain	4.7	7.5	61.7
France	15.4	20.8	35.5
Ireland	12.9	17.1	32.5
Italy	3.1	6.3	105.3
Cyprus		7.8	
Latvia		13.6	
Lithuania		18.9	
Luxembourg	17.1	14.3	-16.2
Hungary		15.2	
Netherlands	17.1	29.1	70.6
Austria	8.8	11.8	33.6
Poland		12.4	
Portugal	6.9	12.1	76.7
Slovenia		7.1	
Slovakia		13.2	
Finland	19.2	17.5	-8.8
Sweden	9.5	13.7	43.5
United Kingdom	19.2	15.1	-21.2

Source: own calculations.

Table 6.6 summarises the mean ASD in the two sub-periods for all Member States of EU-25. These results confirm that, for the Member States where the comparison can be made, prices in the second period have generally become more volatile over time, with four exceptions: Belgium, Finland, Luxembourg and the UK. Whereas the indicators detect increased price volatility, they do not identify the cause. An important issue is the relationship between the milk price volatility observed within the EU, and the price volatility on global dairy markets in the same period. It raises the questions of whether EU dairy measures helped to hold domestic price volatility below that observed in world markets, and whether the relationship between volatility in the two markets shifted after 2003.

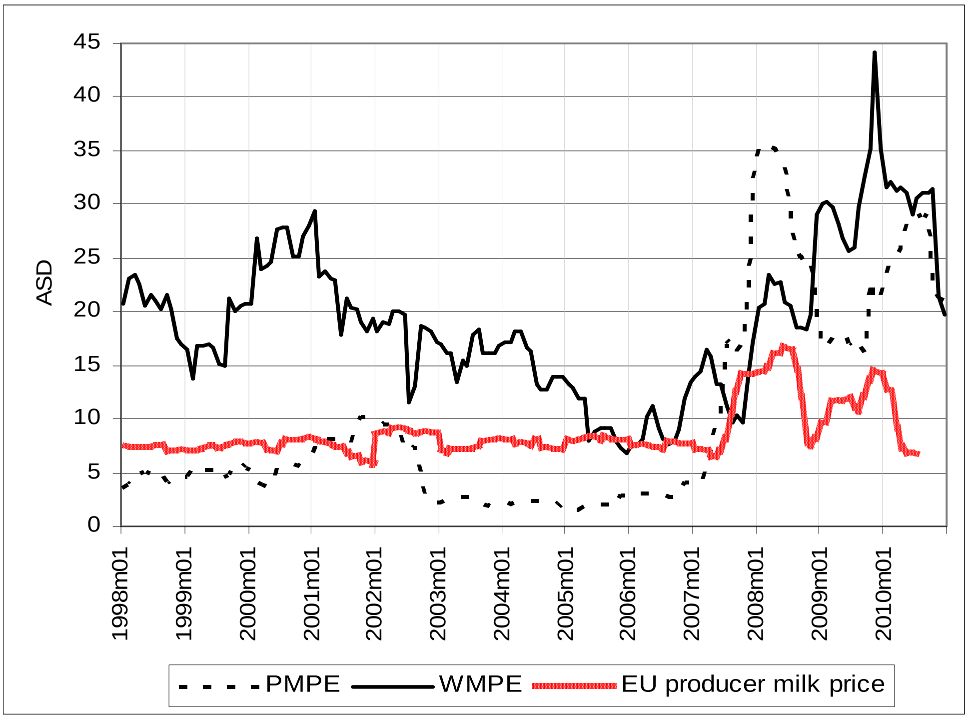
A comparison of the volatility in the WMPE and the PMPE between the two periods shows that the CV of the EU monthly price series increased by 404% in the second period, whereas that of the world market price equivalent increased by 126% (the ratio of the percentage changes is over 3:1). In the seven years before end-2003, the CV of the PMPE was only 31% that of the WMPE; however, after end-2003 it was 66% as high. When the average of the annualised standard deviations is compared between EU prices and world market equivalent prices, and between the two sub-periods, results of a similar order of magnitude are found: the mean ASD of the EU monthly price series increased by 202% between the two sub-periods, whereas that of the world market price equivalent increased by 42% (ratio of nearly 5:1). In the seven years before the start of the evaluation period, the CV of the PMPE was only 34% that of the WMPE; however, during the evaluation period, it was 76% as high.

The following conclusions can be drawn from these findings:

- Milk price volatility increased in both markets between the two periods, but the increase was much greater within the EU than on the world market.
- Milk price volatility was nevertheless still less within the EU than that on the world market in the second sub-period.
- Given the two previous findings, the source of the milk price volatility observed within the EU during the evaluation period was clearly external (deriving from world market disturbances) but CAP policies after 2003 provided EU markets with less protection from these disruptions than was previously available. As long as the IMPE is greater than the WMPE, world market price volatility can be smoothed by the operation of export refunds and the intervention system. When WMPE rises above the IMPE, these instruments can no longer function in the usual way, and the protection is lost. Thus, there is a discontinuity at the point where WMPE=IMPE. The lower the intervention price, and the more susceptible world market prices are to prices surges, then the more likely such conditions are to arise.

If there is good price transmission between processor and producer prices, then one might expect this switch in the relationship between the domestic and world market prices for basic products to hold for the milk price also. This is investigated in Figure 6.7.

Figure 6.7 Volatility of the WMPE, PMPE and the EU-15 producer milk price, 1997-2010



Source: own calculations.

The annualised standard deviations of the PMPE, the WMPE and the monthly milk price received by producers in EU-15 are depicted. The latter price series was used because a monthly milk producer price series for EU-25 is available only from January 2003 onwards. It should be recalled that the WMPE and PMPE are based on the prices of butter and skim milk powder only, whereas the price received by producers for raw milk depends on the value of milk in all uses, to the extent that this is transmitted back up the chain to milk producers from the downstream segments.

This figure shows that for most of the period up to 2007, volatility in the producer milk price was *higher* than that of the PMPE, suggesting that only part of the stabilising effect of EU policies on the prices of intervention products was reflected in the producer milk price. Indeed, for most of the period from mid-2005 to end-2006, the volatility in the EU producer milk price is comparable to that of the WMPE. For most of the period after 2007, volatility in the producer milk price is significantly higher than in the previous period, but much less than that based on the milk price equivalents (EU and world market) for just butter and SMP. The period of about 12 months when the EU PMPE shows more volatility than the WMPE coincides with the period when world market prices exceeded EU intervention prices. making export refunds irrelevant. This is also the period of maximum volatility in the producer price for milk. In summary, the *potentially* lower protection against externally-generated volatility is due principally to the lower safety net provided by the intervention system. From 2004 onwards, the intervention prices for butter and SMP were gradually reduced by 25% and 15% respectively, and the ceiling for butter intervention was reduced from 70 thousand tonnes in 2004 to 30 thousand tonnes in 2008 and onwards (the ceiling for SMP remains unchanged at 109 thousand tonnes). In order to stabilise the milk price at the safety net level as implied by the effective intervention prices for butter and SMP, the Commission undertook special complementary measures, including an extension of the period and maximum duration for private storage aid for butter, an extension of the intervention period beyond the normal August closing date, and buying-in under tender (at prices close to the fixed buying-in price) of significant quantities in excess of the fixed-price ceiling.[42]

The public intervention mechanism has trigger prices that act as a threshold below which intervention purchasing can begin. This mechanism establishes a minimum price floor in the market. However, the instrument primarily protects against downward price volatility, not against upward price swings. When stocks have been accumulated in the past, the release of stocks can help to dampen price increases of dairy products, but this option ceases once stock holdings are exhausted. Therefore, a lower trigger price and a smaller 'buffer' intervention stock holding also reduces the possibility of smoothing sudden upward price movements. The down-scaling of private storage aids also weakened another potential mechanism for promoting stability that may have had a non-negligible consequence in a few Member States.

6.7 Conclusions

Prices paid to producers

- The shift of some income support out of price support (by reducing intervention prices beginning in 2004) and into a direct payment, produced a downward shift in the producer milk price for milk up to the start of 2007. However, during 2007-2008, a continuation of this impact was masked by the high prices transmitted to the EU milk market from the world commodity price boom.
- The average intervention milk price equivalent fell from about €283/t during 1997-2003 to approximately €256/t (-9%) in 2004-2006 and to €216.15/t by 2009 (-23.7% relative to 1997-2003). Thus, the greater reliance on direct payments and the reduction of the public intervention price to a lower safety net level meant a substantially lower support level for milk prices.
- The milk price equivalent for butter and SMP followed the IMPE downwards during 2004-2006, but became detached from it during the price boom of 2007-2008. During these years, it was

[42] An extra 13 thousand tonnes of butter were taken into private storage during the extended time period, whereas intervention buying-in of butter and SMP effectively stopped in early September and early October, despite the extended open period for intervention. However, during the preceding regular intervention period, an additional 53.222 thousand tonnes of butter was bought into intervention beyond the 30-thousand-tonne fixed-price ceiling, and an additional 178.587 thousand tonnes of SMP was bought in beyond the 109-thousand-tonne fixed-price ceiling. The total quantities of butter and SMP bought into intervention during 2009 represent 4.5% and 27.4%, respectively, of their 2009 production.

determined entirely by market forces and was on average 12% above its value in 1997-2003. During 2009 the milk price equivalent for butter and SMP again reached the intervention milk price equivalent.

- Prices for butter and SMP were on average supported 90% above world market price levels during 1997-2003, and around 50% above in 2004-2006. In 2007 and 2008, as a result of very high world market and EU prices, the internal price support offered by EU policies was very low, but at the same time, EU milk producers received record high prices. In these extreme conditions, the EU dairy market showed a high degree of integration with the world market, unprecedented since the start of the CAP. In 2009, EU butter and SMP prices were supported at a level about one-third higher than the world market price.

In conclusion, the changes to the market intervention measures (abolition of the target milk price, lower intervention prices and ceilings, scaling down or elimination of private storage aids and internal disposal aids, and relaxation of quota ceilings) enshrined in the 2003 reform or subsequent modifications increased the convergence of internal and world market prices. When world market prices rose *above* the internal supported price levels in 2007-8, EU market prices followed world market prices closely and the two markets were quite strongly integrated.

Payment System

- The case study surveys show that the changes in CAP dairy measures did not influence the method for calculating payments to milk producers. Processor respondents claimed that the payment system is more or less independent of policy changes, and milk producers reported that their production decisions are not affected by those particular features of the payment system that might depend on policy changes. It is concluded that the policy changes under evaluation did not affect the performance of the milk producing sector via an impact on the payment system.

Price stability

- Volatility increased in both the EU milk price and the world market milk price equivalent after 2003 relative to the preceding period, but the increase was much greater within the EU than on the world market. Nonetheless, milk price volatility within the EU was still less than that of the world market equivalent price, even during the world market commodity boom of 2007-8. The experience of milk price volatility in individual Member States varies considerably. Among the reasons for this are differences in the product portfolios of Member States (consumer products versus basic commodities with related differences in price variations), different fat and protein production patterns and the valuations of these components between countries, heterogeneous milk payments systems, exchange rate movements (between Members States within and outside the euro zone) and different milk price setting strategies used by dairies and related organisations in different countries.
- Raw milk prices reached very high levels in 2007-2008, but fell sharply in 2009. Average milk prices in 2009-2010 relative to 2007-2008 were about 16% lower for EU-15 and 19% lower for EU-10.
- During 2003-2007, CAP measures (export refunds and intervention) provided greater protection against world market price instability to the price of milk destined for butter and SMP than was afforded to the producer price for milk averaged over all uses. The source of the milk price volatility observed within the EU during 2007-9 was external (deriving from world market disturbances and not internally generated). During the period of high world market prices (2007-2008), although volatility in the EU producer price for milk was considerably higher than at any time since 1997, it was less volatile than the EU milk price equivalent based on the prices of butter and SMP. More details on this issue can be found in the analysis relating to evaluation question 5.
- During 2009, following the 2007-8 price spike, the monthly producer price for milk fell very rapidly to a level (in nominal terms) that was at least €1.50/100kg lower than any price observed since 1996. In 2009, the intervention system was complemented by additional measures with the intention of providing a safety net for producers. However, although the EU milk price was successfully stabilised at a considerably higher level than the world milk price equivalent of butter and SMP, the need for adjustments and complementary measures suggest that the normal safety-net system may not always provide a fully effective reaction to extreme events. Furthermore, given the parallel

increase in production costs, the sharp decline in milk price placed considerable pressure on producers' margins. This episode showed that setting the parameters of the intervention system (trigger and buying-in prices, quantity ceilings) for the longer term in a multi-annual perspective makes it less responsive to unforeseen short-term 'crises' where a more effective safety net might be expected.

In conclusion, the policy measures that have been used in the past to stabilise internal milk prices (public intervention and export refunds) were unable to perform this role during the demand-led commodity price boom of 2007-2008 and the price slump that followed in 2009. Their inability to perform this role has two aspects: as the price gap between internal and world market prices becomes narrower, the probability that a price surge on the world market will cause world market prices to rise above internal intervention price levels increases. As long as world market prices are above intervention price levels, both intervention and flexible export refunds – which essentially are designed to provide a minimum safety net price – are ineffective for dampening a price *boom*, and were not designed to perform this role The second aspect is that, with the intervention system reduced to a lower 'safety net' level, a larger internal price fall is needed than in the past before this stabilisation measure is triggered. Moreover, with lower intervention ceilings, the effectiveness of intervention as a stabilising measure is more limited when it has been triggered.

Summary of findings for each indicator, EQ2

Indicator	Expected result	Evidence found
Price support		
Producer price for milk	A fall, starting in 2004 and continuing until 2006-7, was expected.	The expected changes were found for the milk price equivalent based on intervention prices, and for the actual milk price equivalent based on the prices producers received for butter and SMP. For 2007-8, the latter increased again due to the dominance of world prices.
Price support	Price support was expected to fall with the same timing as the fall in the producer price for milk, but less clear-cut/more erratic, because price support also depends on world market prices.	Price support fell after 2003, and by more than the fall in internal prices because world market prices were also rising. Thus, the price gap was squeezed from both sides.
Payment system		
Milk producers' and processors' perceptions of the impact of policy changes on the payment system	Evidence was sought without any a priori expectation of what might be found.	No change was perceived or signalled by market participants.
Evidence on price transmission at first link in the dairy supply chain	There was no a priori expectation about whether/how the degree of price transmission might change as a response to the policy changes.	The evidence on price transmission is not unanimous (it depends on the period studied, the product, and the Member State). However, available evidence shows transmission tends to be weak at the first link in the chain.

Table continues on the next page

<table>
<tr><td colspan="3">Price stability</td></tr>
<tr><td>Comparison of measured price volatility for the period before and after 2003, based on:
• price band indicators (graphical analysis of variability)
• coefficient of variation
• annualised standard deviation</td><td>It was expected that price volatility on domestic markets would increase because of the greater scope after 2003 for market orientation and the weakening of the intervention system.</td><td>Contrary to expectations, volatility in the EU prices for butter and SMP fell during 2003-2006, whereas volatility of the milk price reflecting all uses of raw milk remained constant up to end-2006. However, when world market prices for butter and SMP rose above internal intervention prices (an exogenous development that was not expected ex ante), internal prices became more volatile, with the volatility in EU prices for butter and SMP matching that of the world market prices. CAP stabilisation measures became inoperational.</td></tr>
</table>

7 EQ3: Producers' income

To what extent have the CAP measures applicable to the dairy sector contributed to maintaining / increasing the farmers' income?

7.1 Interpretation and comprehension of the key terms of the EQ3

Focal point of this EQ is the impact of the CAP dairy measures on farmers' income. As explained in Chapter 3, both direct and indirect effects have to be considered. CAP policy measures may affect producer income in a direct way by means of direct producer payments (either being coupled or decoupled from production). Indirect effects are the impact of CAP policy measures (e.g. setting of intervention prices) on the farm gate price of raw milk and the way in which policy measures facilitate structural change in the dairy sector.

Farmers' income[43] can be defined as revenues minus costs (with various specific definitions such as gross margin, farm net value added, economic profit, etc., which mainly depend on the way costs are taken into account). One component of farm revenues (which for specialist dairy farms is usually the main component) is the revenues from milk sales (delivered to dairies or as direct sales). As already became clear when discussing the impact of the EU's dairy policy on producer prices (EQ2), the impact of the EU dairy policy will affect farmers' revenue (earnings from milk sales). Alongside this first indirect impact of CAP policy measures on the income of dairy farmers, there is a direct effect coming from the payments a dairy farmer receives. Payments can be directly related to the dairy activity (coupled payments, such as the dairy premium before 2007) or be decoupled from the dairy production activity (e.g. the single farm payment and the single area payment). Even when not attributable to the dairy activity, they have a direct impact on farmers' income. This also holds for additional aid to farmers, such as the complementary national direct payments (CNDPs) that are made to dairy farmers in some of the Member States that have entered the EU since 2004.

7.2 Methodology used for answering the EQ3

The analysis of the impact of the EU's dairy policy measures on producer income is structured by first presenting the developments in income, in particular farm net value added per agricultural work unit and family farm income per family work unit. The focus of the analysis will be on specialist dairy farms, which due to their specialization in dairy are the farms most dependent and most likely to be affected by policy measures applicable to the EU dairy sector or changes therein.[44] Non-specialist dairy farms are only analysed in terms of their income, not in terms of their costs. Farm income is the result of income from milk and from other products and the decoupled payments. The income indicator resulting depends on

[43] Strictly speaking – and as we are evaluating dairy policy – income should be 'income from dairying' rather than 'farm income'. However, it is difficult to separate income from dairying from income from other sources in the data sources we have used, in particular when farms are non-specialist. Although the main focus of this analysis is on specialist dairy farms, an income indicator for other farms with dairy herds will also be provided. With regard to the importance of specialist dairy farms in the total milk supply by Member State, the reader is referred to Figure 5.12.

[44] According to the EU-FADN a farm is specialist in a certain activity as two third or more of its total revenues come from that specific activity. With respect to specialist dairy farms (TF 41) the criterion is that ¾ or more of the grazing livestock are dairy cows. In this analysis sometimes a broader definition will be followed (more than 50% of revenues coming from dairy activities) in order to ensure a larger share of the dairy cows in particular in the EU-10 and EU-02 Member States (in addition to the standard specialist dairy farm type (TF 41), occasionally also TF 43 (Cattle dairying, rearing and fattening combined, TF 71 (Mixed livestock, mainly dairying), and TF 81 (Field crops –grazing and livestock combined). See Commission (2010) for further details.

the specific margin (farm net value added/tonne[45] or family farm income/tonne[46]) that is used and the denominator that is used (agricultural work units or family work units). See the equation below:

$$\frac{farm\ income}{annual\ work\ unit} = \frac{\frac{milk\ margin}{tonne} * milk\ production + income\ from\ other\ products + decoupled\ payments}{annual\ work\ unit}$$

The income indicators can be further decomposed. Income from milk is equal to the margin per tonne of milk times the volume of milk produced. In a second step the margin will be further decomposed and discussed, with a particular focus on specialist dairy farms and the income coming from dairy activities.

EQ3 not only refers to the level of income and its decomposition in terms of revenues and costs, but also to the maintenance or increase, i.e. the evolution of income of dairy farmers over the evaluation period (benchmark is income level preceding the evaluation period). In this respect also the evolution of income of dairy farmers relative to that of other sectors is of importance (benchmark is income evolution in other sectors of agriculture).

As regards the income decomposition the main focus will be on income coming from milk and on specialist dairy farms. Since, in particular for specialist dairy farms, the milk margin per tonne plays a major role, this is further decomposed into milk revenues per tonne and costs per tonne. The total revenues from milk, include the direct returns on milk (milk price) and the coupled payments (from EU or national origin). The total costs of production of milk can be decomposed into specific costs, non-specific costs, depreciation, costs associated with external factors and imputed costs for family factors. Given the interest to detect the impact of changes in the EU policy measures applicable to the dairy sector, the decomposition will in particular focus on milk revenues, milk price, and coupled and decoupled payments.

The concepts used and their definitions are given in Table 7.1. Note that in order to have the complete picture it is not only the milk margin, but also farm scale (volume of milk produced per AWU) that plays an important role in understanding the income evolution. The latter provides the link between income evolution and structural change. A separate section is devoted to this, in which also cross-references to the discussion provided in EQ1.

The income results used are obtained from the EU-FADN database. The results on milk costs and margins are from the estimation model that was developed in the EU-FADN[47] unit of the European Commission. The model has been slightly modified for this study by the von Thünen Institute in Braunschweig (vTI) and applied to calculate costs and margins of milk production as well as income shares of dairy farms. Reallocation of costs to the dairy sector is based on different shares, i.e. share of milk in total output or share of dairy livestock units within total livestock units. The model only uses data from: specialist dairy farms (TF 41); cattle dairying and rearing (TF 43); mixed livestock, mainly dairying (TF 71); and field crops and grazing livestock combined (TF 81). In order to obtain reliable estimates of costs, revenues and margins related to the dairying activity, special attention will be given to specialist dairy farms.

EU-FADN data for the years 2003 to 2007[48] are used, in which unbalanced samples of specialist farms are selected.[49] Calculations are based on the level of individual farms. The results are aggregated by different criteria like Member State, farm size (expressed by the number of dairy cows). Since the composition of the sample is not the same each year, one should be careful to draw any conclusions from small changes in variables. When there are there are substantive changes in indicators, however, this signals changes going beyond re-sampling-effects.

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[45] Farm net value added is equal to gross farm income (value of output minus total operating costs) less costs of depreciation.
[46] Family farm income is equal to farm net value added less the costs associated with external factors (wages, rent and interest paid).
[47] For further details about the concepts used see as a reference "European Commission, Agriculture and Rural Development: EU dairy farms report 2010 based on EU FADN".
http://ec.europa.eu/agriculture/rica/pdf/dairy_report_2010.pdf.
[48] At the time of model analysis EU FADN data were only available until 2007.
[49] Here there are many figures showing evolution over time. However because the data are taken over from EU FADN it could be that the sample changes over time. Whereas in the graphs in this section for convenience sake points are joined, the reader should be aware of the basic nature of the data and that small changes in data over time may be a statistical phenomenon related to the changes in the sample.

Table 7.1 Income, margin, revenues and cost concepts

Concept	Definition
Income	
Farm net value added/ annual work unit	Remuneration to the fixed factors of production (work, land and capital), whether they be external or family factors. As a result, holdings can be compared irrespective of their family/non-family nature of the factors of production employed.
Family Farm Income/FWU only for farms with family labour (sub-sample of farms)	Remuneration to fixed factors of production of the family (work, land and capital) and remuneration to the entrepreneur's risks (loss/profit) in the accounting year per family working unit. Takes into account differences in the family labour force to be remunerated per holding.
Gross farm income (before taxes and subsidies)/ annual work unit	Value of output minus intermediate consumption plus balance of current subsidies and taxes.
Margin	
Gross margin over operating costs/tonne of	Milk and milk products revenues minus specific costs (feed, veterinary…) and non-specific or other operating costs (upkeep of machinery, energy,
Revenues (Returns)	
Raw milk price/tonne of milk	Ex farm gate price.
Total milk revenues in €/t	Includes the value of sales of milk and milk products; the EU dairy payments (11.81 €/t of quota in 2004, 23.65 €/t in 2005, 35.50 €/t in 2006 until its decoupling; the actual implementation date of the payments depends on the Member State) and Article 69 payments for dairy (used in Spain); the possible national dairy payments.[50]
Coupled payments/tonne of milk	Payments that are linked to production (e.g. the dairy premium before it has been decoupled, slaughter premia)
National aids/tonne of milk	Payments received from national aid programs, of which the Complementary National Direct Payments are a part.
Decoupled payments per farm or per AWU	Payments received by farmers that are not linked to production (e.g. the dairy premium after it has been decoupled from production, the Single Farm Payment, the Single Area Payment and Additional Aid)
Costs	
Total costs of milk/tonne of milk	Includes total operating costs plus costs of external factors plus depreciation plus imputed family factor costs
Specific costs of milk/tonne of milk	Costs for milk production, covering purchased concentrates, purchased coarse fodder, farm use of non-fodder crops, specific forage costs, milk herd renewal costs, the milk levy and other specific livestock costs (veterinary etc.)
Feed costs/tonne of milk	Cost for purchased feed and forage feed
Non-specific costs/tonne of milk	Includes upkeep of machinery and buildings, power (fuel and electricity), contract work, taxes and other dues (excluding the milk levy), taxes on land and buildings, insurance for farm buildings and other direct costs (including water as regards the model for milk)

[50] This means that the value of the calves and of the sales of cull dairy cows is not taken into account, because no satisfactory method has been found to estimate this value on the basis of the current data.

7.3 Judgement criteria, indicators and information sources used for each indicator

In order to assess the contribution of changes in the CAP measures to maintaining and increasing farm income, an assessment is made of the evolution of two key farm income indicators: Farm Net Value Added per Annual Work Unit (FNVA/AWU) and Family Farm Income per Family Work Unit (FFI/FWU). The analysis is primarily done in nominal terms. By this approach the introduction of additional price and cost changes due to deflating the data by Member State-specific deflators is avoided. For the income indicator FNVA/AWU, however, real values will also be presented. Where EQ3 refers to 'maintaining' or 'increasing' farm income, the farm income at the beginning of the evaluation period (2000-2003) will be taken as a natural reference.

Table 7.2 summarises the indicators, the required data and their sources.

Table 7.2 Indicators, data requirements and information sources for EQ3

Indicator	Data requirement	Information sources
Income (dairy related and general for farming)	• Farm Net Value Added for specialist dairy farms per Annual Work Unit • Farm Family Income/Family Work Unit • Income evolution (Farm Net Value Added per AWU including coupled and decoupled payments and national aids) of all specialist dairy farms of type TF41 (measured as an index) • Share of subsidies in gross farm income • Income (measured in terms of Farm Net Value Added) of dairy farming relative to other agricultural sectors	EU-FADN
Sub-indicator: milk margins	• Gross margin over operating costs for specialist EU dairy farms by Member State (excluding coupled payments and national aids), in €/t • Gross margin over operating costs in euro per tonne	EU-FADN
Sub-indicator: Composition of costs of production for milk	• Specific costs of milk (€/tonne of milk) for specialist dairy farms • Average feed costs (including roughage) in € per tonne of milk for specialist dairy farms • Non-specific costs of milk production (€/tonne) • Imputed costs (family labour and capital) measured in € per tonne of milk for specialist dairy farms • Farm herd size and percentage coverage of costs by revenues	EU-FADN (+ own calculations)
Sub-indicator: Milk returns	• Raw milk price as received by specialist dairy farmers in EU-15, EU-10 and EU-02 in the period 2000-2007 • Total milk revenues in €/t • Average coupled payments and national aid receipts per tonne of milk and per average specialist dairy farm	EU-FADN
Indicator	**Data requirement**	**Information sources**
Sub-indicator: Development in milk farm size, structure and productivity	• Farm herd size • Dairy cows/AWU (EU-15, EU-10, EU-02) • Milk output/AWU (EU-15, EU-10, EU-02)	Eurostat (FSS), EU-FADN, Evidence from EQ2
Sub-indicator: payments	• Subsidies to dairying • Dairy premium • Decoupled payment (SFP, SAPS)	EU-FADN

The judgement criteria used to answer EQ3 evaluates the evolution of farm income indicators relative to this benchmark. When this is not possible (comparable data before 2004 and 2007 are not available for EU-10 and EU-02, respectively), the judgement will be based on observed trends. The focus will be on changes in the indicator variables and their causes including linkages with policy changes in the period

2003-2007 as compared to 2000-2003. In order to facilitate this analysis a decomposition of income in terms of sub-indicators margin per tonne of milk and production of milk per annual work unit is made. Subsequently the milk margin is further decomposed into revenues from milk, subsidies, and costs (where the latter are decomposed into specific costs, non-specific costs, and other cost categories).

As a second judgement criterion, the farm income earned by specialist dairy farmers (measured in terms of farm net value added per AWU) is related to a benchmark variable comprising a proxy for the average evolution of producer income at MS level. This proxy variable is based on income indicators for mainly specialist (other) farm types. This allows for an evaluation of the income evolution in the dairy sector relative to that in other agricultural sectors.

A third judgement criterion is the share of direct payments and national aids in farm income, which provides a measure indicating the importance of direct farm income support, relative to the part of farm income (revenues from farm produce) which is supported via the milk price. In particular attention will be paid to what extend direct payments and national aids have contributed to maintain or improve farm incomes.

7.4 Dairy farm income

7.4.1 Farm net value added per annual work unit (FNVA/AWU)

A first income indicator to measure the economic performance of EU dairy farms is the Farm Net Value Added per Annual Work Unit (FNVA/AWU). FNVA correspond to total output minus total operating costs and depreciation. It is the amount available to remunerate labour, land and capital (see the EU dairy report 2010). This indicator allows holdings to be compared irrespective of the family/non-family nature of the production factors employed. A second indicator is family farm income per family farm working unit, where family farm income is the income that remains after all costs and factors are paid except those for the family workers.

Table 7.3 presents the Farm Net Value Added per Annual Working Unit (FNVA/AWU) for the average specialist dairy farm by Member State (decoupled payments are excluded). Denmark had the highest FNVA/AWU between 2000 and 2007, followed by the Netherlands, Belgium, the UK and Luxembourg, which all have a FNVA/AWU over the whole period that is on average larger than €35,000. Romania has the lowest average FNVA/AWU (€2,441). Other Member States having a relatively low FNVA/AWU are Slovakia, Bulgaria, Slovenia, Latvia, Lithuania and Poland (their average FNVA/AWU is below €7,500).[51]

As can be seen from Table 7.3, the FNVA/AWU increased over the period 2000-2007 in the EU-15 as well in the EU-10, although the increase is less pronounced for the latter EU region.[52] In 2007 there was a marked increase in the FNVA/AWU. In a following section it will be explained that when decomposing the milk margin and production of milk, it is shown that even if a producer has a low margin per tonne, he/she can still have a high income if the quantity produced is large (see Section 7.5). The increase of the FNVA/AWU was more marked after 2003, which – as will be explained further in Section 7.6 – is to an important extent related to the increase in coupled payments (dairy premium) received by dairy farmers.

[51] There is not only a wide spread over Member States, but also over farms within Member States.
[52] To remind the reader, blank cells in tables denote non available data. Since for Cyprus nearly all values were missing, this Member State has been left out from the Tables.

Table 7.3 Farm net value added for specialist dairy farms, €/AWU

	2000	2001	2002	2003	2004	2005	2006	2007
Belgium	38,398	42,245	38,398	41,883	38,828	42,155	44,788	55,567
Denmark	44,938	41,200	48,391	49,810	53,849	57,932	70,374	87,705
Germany	27,107	24,449	25,942	24,449	29,153	30,917	34,483	45,561
Greece	13,205	10,943	14,026				12,583	
Spain	17,158	21,657	24,224	22,802	29,133	33,207	31,369	34,334
France	22,451	22,260	23,273	21,446	22,566	24,430	24,217	29,394
Ireland	24,116	27,636	25,687	30,590	31,467	33,003	30,445	41,358
Italy	22,972	26,890	30,106	31,132	30,797	41,126	38,921	41,126
Luxembourg	29,972	34,708	32,128	36,034	32,885	34,599	36,815	46,318
Netherlands	48,582	48,307	46,440	47,169	55,509	54,474	55,509	69,329
Austria	13,664	15,994	16,246	13,902	16,046	17,095	20,266	22,489
Portugal	8,366	8,734	10,340	10,426	12,456	12,452	13,409	14,260
Finland	15,674	18,680	18,688	18,680	19,251	18,579	17,424	21,358
Sweden	23,718	19,305	22,829	22,803	21,982	24,607	26,277	33,543
United Kingdom	29,935	39,265	33,695	38,178	36,522	38,178	37,738	49,705
EU-15	24,931	26,632	26,856	26,780	28,838	31,090	32,380	40,155
Czech Republic					9,227	10,317	10,750	12,743
Estonia					8,132	8,638	8,716	12,955
Hungary					9,728	11,026	12,643	13,354
Lithuania					6,911	6,709	5,978	9,011
Latvia					5,412	5,260	6,645	6,181
Malta								
Poland					5,486	6,123	7,983	9,761
Slovakia					808	5,596	-1,758	5,133
Slovenia					2,479	4,086	4,407	5,983
EU-10					5,712	6,497	7,627	9,670
Bulgaria								3,255
Romania								2,441
EU-02								2,543

Source: EU-FADN.

Table 7.4 provides information on FNVA/AWU for non-specialist dairy farms. In the EU-15 the FNVA/AWU for non-specialist dairy farmers was by €3,800 lower (average over 2000-2006) than for specialist dairy farmers. In the year 2007 the difference became larger (about €8000): specialist dairy farms benefited relatively more from the high raw milk prices than non-specialist dairy farms. In the EU-15, non-specialist dairy farms in France and Luxembourg had consistently a higher FNVA/AWU than specialist dairy farms. For Austria, non-specialist dairy farms did sometimes slightly better and sometimes not. The FNVA/AWU of the specialist dairy farms of Poland, Slovakia and Slovenia was below the EU-10 average. Similar to specialist dairy farms, the FNVA/AWU increased as well for the non-specialist dairy farms, although on average not as quick. This implies that the divergence between specialist and non-specialist dairy farms increased between 2000 and 2007 (this holds both before and after 2003). An increase in the trend for the NVA/AWU could also be observed for the non-specialist farms, although less pronounced than in the case of the specialist dairy farms. This is expected, given that the non-specialist dairy farms also rely on other agricultural activities than dairy.

Table 7.4 Farm net value added for non-specialist dairy farms, €/AWU

	2000	2001	2002	2003	2004	2005	2006	2007
Belgium	33,519	34,866	33,088	40,954	38,887	41,428	46,293	53,529
Denmark	42,493	39,279	35,489	41,854	45,670	44,432	67,108	72,077
Germany	24,463	23,693	23,224	23,150	28,862	28,542	30,442	38,464
Greece	8,557	8,305	8,128					
Spain	22,887	18,645	25,921	25,343	21,884	19,277	15,253	19,140
France	27,674	27,220	28,295	26,825	27,735	28,801	29,728	37,320
Ireland	19,231	20,633	25,312	25,915	30,654	31,228	28,219	26,768
Italy	16,610	19,692	18,612	20,611	13,359	16,537	19,084	21,962
Luxembourg	38,926	40,863	38,040	38,457	38,131	47,646	41,482	47,911
Netherlands	33,880	32,751	67,226	42,783	44,022	78,324	55,271	61,067
Austria	15,096	16,512	15,935	15,211	16,252	17,950	18,215	21,050
Portugal	4,181	2,182	7,810	4,625	9,328	6,226	11,957	11,721
Finland	19,637	15,224						26,348
Sweden	14,849	15,938	20,209	21,693	14,452	36,576	30,512	26,115
United Kingdom	30,476	34,809	28,370	37,662	33,436	42,276	39,686	47,849
EU-15	22,287	22,955	23,426	23,805	25,247	26,302	26,604	32,145
Czech Republic					9,195	9,621	10,321	12,992
Estonia					7,849	8,253	6,017	13,538
Hungary					10,464	10,565	11,302	14,456
Lithuania					4,700	4,826	4,354	6,600
Latvia					2,959	3,853	4,351	6,014
Malta								
Poland					7,810	4,625	9,328	6,226
Slovakia					3,595	5,254	212	6,690
Slovenia					3,916	14,153	3,599	4,726
EU-10					3,992	4,427	4,429	6,362
Bulgaria								2,946
Romania								1,533
EU-02								1,567

Source: EU-FADN.

7.4.2 Family farm income per family work unit (FFI/FWU)

Table 7.5 provides information on the development of family farm income per family working unit (FFI/FWU) by Member State (including coupled payments, national aids and decoupled payments). As compared to the NFVA/AWU, this indicator corrects for the external factors that have to be paid and provides an indicator of how the family workers are remunerated. Member States with a relatively high family farm income per family worker were Italy, the UK, and the Netherlands (average income was larger than €30,000 per dairy farm). Note that in the last two countries, the size of the dairy farm operations is relatively large as compared to most other Member States. Member States with relatively low incomes were Slovenia, Poland, Latvia, Lithuania and Estonia (average over period 2003-2006 was less than €10,000). For the EU-15, the general trend in FFI/FWU was positive: for most Member States family farm income increased over 2000-2007 (exceptions are Finland and Ireland). Note that the entrepreneurial risk ('residual' profits) is part of this income indicator. This implies that fluctuations in profits affect the family farm income and might add to the fluctuations in this variable. Irrespective of the observed fluctuations, however, an increasing trend could be still seen for the period 2003 2006 in the EU-15 Member States. When analysing FFI/FWU in real terms, there was still a general improvement of income in the period 2003-2006. When evaluating FFI/FWU in real terms, most Member States faced a limited decline in FFI/FWU for the year 2006 (exceptions are Austria, Belgium, Denmark, Germany and Finland).

Table 7.5 Family farm income per family farm working unit, €

	2000	2001	2002	2003	2004	2005	2006	2007
Austria	13,114	15,202	14,628	12,648	13,710	15,563	17,752	19,334
Belgium	25,357	27,934	23,342	26,485	25,914	32,413	33,621	45,339
Denmark	18,608	11,510	12,112	14,796	16,785	23,224	33,522	40,713
Finland	13,824	15,228	16,240	17,072	17,365	16,484	15,017	19,085
France	17,681	16,606	17,228	15,831	16,406	18,208	17,626	21,640
Germany	19,558	18,008	16,794	15,190	20,157	23,422	26,046	38,701
Greece	13,627	11,318	11,738	15,873			19,731	
Ireland	21,413	24,639	22,874	26,756	28,573	30,193	25,750	37,815
Italy	20,707	26,316	28,225	29,970	31,990	37,656	43,031	41,557
Luxembourg	26,079	26,123	24,640	29,148	26,630	30,067	31,913	40,843
Netherlands	31,192	28,326	25,092	25,317	27,695	37,441	33,180	44,960
Portugal	7,583	6,783	7,762	9,705	11,174	11,166	11,090	14,037
Spain	14,109	17,987	20,964	20,042	26,815	32,525	29,621	34,829
Sweden	12,815	8,764	10,166	10,327	9,467	16,383	15,269	22,511
United Kingdom	19,907	36,159	24,779	26,854	30,755	34,957	32,451	49,715
EU-15	18,372	19,393	18,439	19,734	21,674	25,693	25,708	33,649
Czech Rep.					9,167	11,974	13,624	16,201
Estonia					11,470	7,723	7,432	10,973
Hungary					15,900	12,197	14,258	16,536
Latvia					5,170	7,098	6,961	7,640
Lithuania					6,840	8,586	8,979	8,548
Malta						16,416	18,268	20,019
Poland					4,323	5,105	6,724	8,425
Slovakia					2,253	-2,099	-4,195	6,293
Slovenia					4,200	7,332	4,190	5,285
EU-10					6,592	8,259	8,471	11,102
Bulgaria								3,255
Romania								2,262
EU-02								3,029

Source: EU-FADN.

7.4.3 Income evolution (nominal and real)

Table 7.6 provides more insights into the evolution of FNVA/AWU (including both the coupled as well as the decoupled payments) that specialist dairy farmers (TF-41) receive, with rates of change added for different sub-periods. Although the decoupled payments are not specifically related to the dairy activity, they are still part of the income a farmer receives. As can be deduced for all Member States in EU-27, the farm net value added was either preserved or improved as compared to 2003 (index = 1) (and EU-10 the comparison is with the year 2004). The market disturbance in 2007 created an exceptional situation, with, relative to previous periods, extreme increases in FNVA/AWU (Italy being an exception). For the EU-15 the annual growth rate (6.6%) in the period 2003-2006 was higher than that in 2000-2003. For the EU-10 for the period 20004-2006 a comparable annual growth rate was found (6.3%).

Looking at the growth rates, it turns out that in the EU-15 the increase in farm net value added in Ireland, Finland, Estonia and Lithuania was negative in the period 2003-2006. Luxembourg, France, and the UK also showed relatively low income growth rates. As for the EU-10, Estonia, Lithuania and Slovakia are the countries with declining in farm net value added over the period 2003-2006. Slovakia, Hungary, Czech Republic and Latvia show relatively high rates of increase in the period 2003-2006.

Except for Finland, it holds that the indices presented in Table 7.6 increased faster in the period 2003-2006 than in period 2000-2003. The year 2007 was influenced by the market disturbance that took place and which lead to high milk prices (and a decline thereafter, which already started in 2008). All in all, the performance of the dairy sector during the evaluation period (starting in 2003) was better than in the preceding period. This is due to the additional payments, which compensated for the decline in the milk price the farmers faced.

Table 7.6 Income evolution (farm net value added per AWU) of specialist dairy farms (index 2003 = 1)

	2000	2001	2002	2003	2004	2005	2006	2007	annual growth rate (%)[1]			
									'00-'08	'00-'03	'03-'06	06-'07
Belgium	0.97	1.04	0.92	1.00	0.99	1.17	1.21	1.53	6.75	0.99	6.67	26.4
Denmark	0.89	0.83	0.96	1.00	1.08	1.15	1.43	1.75	10.09	3.85	12.62	22.5
Germany	1.15	1.10	1.06	1.00	1.18	1.30	1.43	1.90	7.42	-4.54	12.54	33.06
Greece	0.85	0.79	0.79	1.00			1.17			5.37	5.4	
Spain	0.71	0.90	1.04	1.00	1.34	1.59	1.45	1.71	13.25	11.87	13.19	17.73
France	1.05	1.02	1.06	1.00	1.03	1.12	1.08	1.28	2.88	-1.7	2.73	18.45
Ireland	0.80	0.92	0.86	1.00	1.06	1.11	0.99	1.37	7.97	7.72	-0.27	37.9
Italy	0.74	0.90	0.98	1.00	1.07	1.22	1.37	1.35	9.1	10.79	11.0	-1.08
Luxembourg	0.89	0.93	0.88	1.00	0.89	0.95	1.02	1.26	5.03	3.85	0.59	23.68
Netherlands	1.03	1.02	1.02	1.00	1.04	1.22	1.18	1.47	5.24	-1.01	5.53	25.44
Austria	1.00	1.14	1.11	1.00	1.09	1.21	1.35	1.51	6.06	0.00	10.52	11.85
Portugal	0.90	0.80	0.90	1.00	1.25	1.21	1.20	1.49	7.42	3.54	6.21	24.06
Finland	0.83	0.91	0.97	1.00	1.02	0.99	0.93	1.16	4.92	6.56	-2.25	23.89
Sweden	1.02	0.85	1.01	1.00	0.97	1.20	1.27	1.54	6.06	-0.67	8.16	21.77
UK	0.86	1.15	0.97	1.00	1.07	1.13	1.09	1.43	7.51	5.07	2.79	31.75
EU-15	0.90	0.95	0.96	1.00	1.08	1.19	1.22	1.48	7.3	3.64	6.57	21.51
Czech Rep.					1.00	1.15	1.22	1.41			6.85	15.57
Estonia					1.00	1.00	0.93	1.43			-2.39	53.76
Hungary					1.00	1.14	1.25	1.44			7.72	15.2
Latvia					1.00	1.13	1.24	1.29			7.43	4.03
Lithuania					1.00	1.14	0.97	1.24			-1.01	27.84
Malta						1.00	1.06	1.14				7.55
Poland					1.00	1.20	1.61	1.93			17.2	19.88
Slovakia					1.00	3.57	0.79	5.32			-7.56	
Slovenia					1.00	2.63	1.72	2.01			19.81	16.86
EU-10					1.00	1.55	1.2	1.58			6.23	31.79

Notes: 1) Annualized growth rates. For EU-10 growth rate '04-'06 is used rather than '03—'06. For EU-02 no evolution could be shown. No changes for Bulgaria and Romania could be detected since there data were included starting from 2007.

Source: EU-FADN.

Whereas in Table 7.6 the income evolution is presented in nominal terms, Table 7.7 shows the income evolution in real terms (numbers deflated with an agricultural GDP deflator specific for each Member State). The rates of change differ over Member States and over time. Member States having a relatively high income improvement in the period 2003-2006 were Slovenia, Poland, Germany, Czech Republic, and Denmark (the increase of FNVA/AWU was more than 30%). In Finland, Ireland, Luxembourg and Latvia the real FNVA/AWU (taking into account all subsidy payments) declined in the period 2003-2006. In the same period in the UK, France and Lithuania the real income (FNVA/AWU) stagnated. For other Member States it increased. An unexpected increase was Slovakia in the extreme year 2007. Note that the real FNVA/AWU in 2006 declined as compared to the year 2000 in France, Luxembourg and the Netherlands; this has also been the case for Estonia, Lithuania and Latvia in comparison to 2004, their year of entry into the EU.

Table 7.7 Income evolution in real terms (index FNVA/AWU, with 2003 = 1)

	2000	2001	2002	2003	2004	2005	2006	2007
Austria	1.05	1.18	1.14	1.00	1.08	1.18	1.28	1.41
Belgium	1.03	1.08	0.95	1.00	0.97	1.12	1.13	1.40
Denmark	0.95	0.86	0.97	1.00	1.06	1.10	1.32	1.59
Finland	0.85	0.91	0.96	1.00	1.03	0.98	0.91	1.10
France	1.12	1.07	1.08	1.00	1.02	1.08	1.02	1.18
Germany	1.20	1.14	1.08	1.00	1.19	1.29	1.42	1.84
Greece	0.95	0.85	0.83	1.00			1.08	
Ireland	0.91	0.99	0.89	1.00	1.04	1.07	0.92	1.25
Italy	0.80	0.94	1.00	1.00	1.03	1.15	1.27	1.23
Luxembourg	0.97	1.01	0.94	1.00	0.88	0.89	0.89	1.08
Netherlands	1.15	1.08	1.05	1.00	1.03	1.17	1.13	1.39
Portugal	1.00	0.86	0.93	1.00	1.22	1.15	1.11	1.35
Spain	0.81	0.98	1.09	1.00	1.29	1.48	1.28	1.46
Sweden	1.09	0.88	1.03	1.00	0.97	1.20	1.23	1.46
United Kingdom	0.93	1.22	0.99	1.00	1.04	1.07	1.01	1.29
EU-15	0.97	0.99	0.99	1.00	1.06	1.14	1.13	1.34
Czech Republic					1.00	1.16	1.21	1.35
Estonia					1.00	0.95	0.81	1.13
Hungary					1.00	1.12	1.18	1.27
Latvia					1.00	1.02	1.02	0.89
Lithuania					1.00	1.07	0.85	1.00
Malta								
Poland					1.00	1.16	1.54	1.79
Slovakia					1.00	3.49	0.75	4.99
Slovenia					1.00	2.58	1.66	1.86
EU-10					1.00	1.57	1.13	1.79
Bulgaria								1.00
Romania								1.00
EU-02								1.00

Source: EU-FADN.

7.4.4 Dairy income relative to incomes of other agricultural sectors

In order to assess the performance of the dairy sector relative to that of other main sectors in EU agriculture, for each MS the ratio has been calculated of the average farm net value added per dairy farm over the average farm net value added realized per farm outside dairy. For this the income evolution in specialist dairy farms (TF 8.5) is compared to a set of non-dairy farm activities (includes farm types TF 8.1 (Field crops), TF 8.2 (Horticulture), TF 8.3 (Wine), TF 8.4 (Other permanent crops), TF 8.6 (Other grazing livestock), TF 8.7 (Granivore), and TF 8.8 (Mixed farms)). The results are presented in Table 7.8. Considering the ratios over the period 2000-2007, it is shown that the income evolution in the dairy sector lagged behind that of other agricultural sectors in Austria (average value is 0.81), France (0.84) and Finland (0.88). In contrast, the farm net value added achieved in dairying was about twice that of other types of agriculture in Ireland (2.15) and Portugal (1.97). Also the income of the dairy sector evolved favourably in the Netherlands (1.44) and Spain (1.40) relative to that of other agricultural sectors. The performance of the dairy sector relative to the rest of agriculture declined in Denmark, France, Ireland, Luxembourg and Finland during the sub-period 2003-2006. For most Member States in the EU-10 the relative income in dairy farming increases in the period 2004-2006, after which it shows a decline in 2007 (exceptions are Estonia and Latvia). Member States showing an increasing relative income trend are Germany, Belgium, Spain, the Netherlands and Italy. For most other Member States the ratio is fluctuating, without a clear trend.

Table 7.8 Income of specialist dairy farming relative to other agricultural sectors (measured in terms of FNVA/AWU)

	2000	2001	2002	2003	2004	2005	2006	2007
Austria	0.84	0.84	0.85	0.73	0.74	0.81	0.84	0.81
Belgium	0.90	0.96	0.98	0.89	0.97	1.09	1.02	1.31
Denmark	0.94	0.85	1.37	1.32	1.29	1.16	1.20	1.66
Finland	0.77	0.84	0.82	0.93	0.98	0.93	0.81	0.70
France	0.84	0.80	0.86	0.83	0.83	0.92	0.81	0.81
Germany	1.02	0.98	1.07	0.94	0.95	1.08	1.09	1.30
Greece	1.34	1.25	1.09	1.41			1.48	
Ireland	2.05	2.36	1.94	2.05	2.11	2.10	1.83	2.49
Italy	1.51	1.75	1.54	1.47	1.60	1.77	1.89	1.67
Luxembourg	1.01	1.09	1.06	1.26	1.09	1.17	1.19	1.35
Netherlands	1.39	1.21	1.45	1.24	1.45	1.56	1.29	1.83
Portugal	2.30	1.55	1.52	1.68	2.07	2.15	1.67	2.10
Spain	0.79	1.05	1.07	1.05	1.43	1.97	1.64	1.73
Sweden	1.61	1.05	1.15	1.17	1.09	1.13	1.18	0.80
United Kingdom	1.14	1.47	1.03	1.00	1.29	1.22	1.06	1.20
Czech Republic					0.86	0.97	0.92	0.86
Estonia					1.48	1.09	1.00	0.89
Hungary					1.00	1.20	1.27	1.10
Latvia					1.12	1.15	0.91	0.74
Lithuania					1.03	1.19	1.08	0.72
Malta						1.62	1.43	1.39
Poland					1.13	1.33	1.44	1.37
Slovakia					0.31	0.80	1.10	0.74
Slovenia					1.29	2.82	2.71	1.69
Bulgaria								0.88
Romania								1.32

Notes: Dairy farming follows TF8.5; other sectors included are TF8.1, TF8.2, TF8.3, TF8.4, TF8.6, TF8.7 and TF 8.8.

Source: EU-FADN.

7.5 Income from milk

Income from milk is the result of the milk margin times the production of milk. In this section milk margin and milk production per annual working unit are further discussed.

7.5.1 Milk margin

Table 7.9 provides the gross margins on milk for the average specialist dairy farm by Member State over the period 2000-2007. Italy, Belgium, Romania, Belgium and Luxembourg are Member States with relatively high gross margins (average for period 2000-2007 was above €160/t). Slovenia, Estonia, Finland, Czech Republic, Latvia, Hungary and Slovakia belong to the groups having relatively low gross margins (average over the period 2000-2007 was less than €100/t). For the period 2004-2007 the average gross margins in the EU-15 and EU-10 are, respectively, 128.51 and 106.47 euros per tonne (difference €22.04/tonne of milk).

Except for Spain[53], for all other EU-15 Member States the evolution of gross margin showed a declining pattern since early 2000 (e.g. since 2002 or 2003), with a turning point in 2006, after which in 2007

[53] When comparing the economic results of dairy farms based on information from the Farm Accountancy Data Network (FADN) for Spain and Galicia with those obtained from other regional networks in particular with that

there was a marked increase. The increase in 2007 is clearly related to the disturbance of the dairy markets, with strongly increasing prices of dairy products, whereas the decline in the period 2003-2006 correlates with the decline in intervention prices and export refunds following from the 2003 CAP-reform. Most EU-10 Member States also showed an increase in gross margin in 2007 (Czech Republic and Hungary being exceptions), and only Estonia showed a decline in gross margin similar to that taking place in the EU-15. In most other EU-10 Member States, the gross margins varied from being stable to modestly increasing. Given the relatively strong increase in the milk price, it is was expected that gross margins would show a higher increase in the EU-10 than what is actually observed (e.g. revenues from milk do show a significant increase). As will be explained later (see Section 7.7), the reason is that for the EU-10 costs also increased in relative terms. In the period 2004-2007 specific costs increased in the EU-10 by about 28% and non-specific costs by about 30%, while the milk price increased only by 17%.

Table 7.9 Gross margin over operating costs for specialist EU dairy farms by Member State (including coupled payments and national aids), €/t

	2000	2001	2002	2003	2004	2005	2006	2007
Belgium	177.55	188.76	162.97	162.91	159.67	147.61	144.09	187.79
Denmark	149.62	148.60	146.75	139.19	125.97	116.08	110.97	136.85
Germany	147.74	152.17	129.29	116.57	115.28	105.04	106.20	158.31
Greece	139.38	118.67	132.38					
Spain	147.10	168.52	147.29	146.89	159.63	153.47	147.48	182.91
France	139.14	141.27	137.10	127.85	120.72	115.82	98.59	118.08
Ireland	150.79	158.92	134.84	131.55	131.51	118.80	106.99	157.23
Italy	190.40	204.75	228.74	192.86	186.72	181.58	189.23	198.63
Luxembourg	162.53	179.81	168.51	165.83	154.87	140.09	132.02	178.93
Netherlands	171.28	183.37	162.83	156.29	145.64	142.71	128.87	168.73
Austria	140.42	168.05	154.61	112.70	117.56	110.50	113.04	132.37
Portugal	112.43	111.15	126.11	116.61	115.95	108.38	97.19	112.77
Finland	97.67	97.44	105.99	108.82	93.13	70.40	69.15	82.89
Sweden	145.23	116.85	119.51	134.30	111.83	94.21	77.09	88.81
United Kingdom	117.76	139.15	108.47	108.11	107.18	101.06	87.66	120.06
EU-15	147.44	155.67	142.27	134.29	129.72	121.99	114.45	147.89
Czech Republic					81.47	88.56	79.09	78.39
Estonia					102.22	88.52	78.21	96.18
Hungary					50.70	72.71	65.77	63.71
Lithuania					105.65	113.22	102.31	136.36
Latvia					53.74	73.35	68.49	78.38
Malta								
Poland					102.68	116.73	116.59	138.75
Slovakia					49.47	53.89	18.10	83.29
Slovenia					98.89	109.92	110.46	113.58
EU-10					93.88	107.79	103.20	121.00
Bulgaria								111.79
Romania								191.05
EU-02								173.41

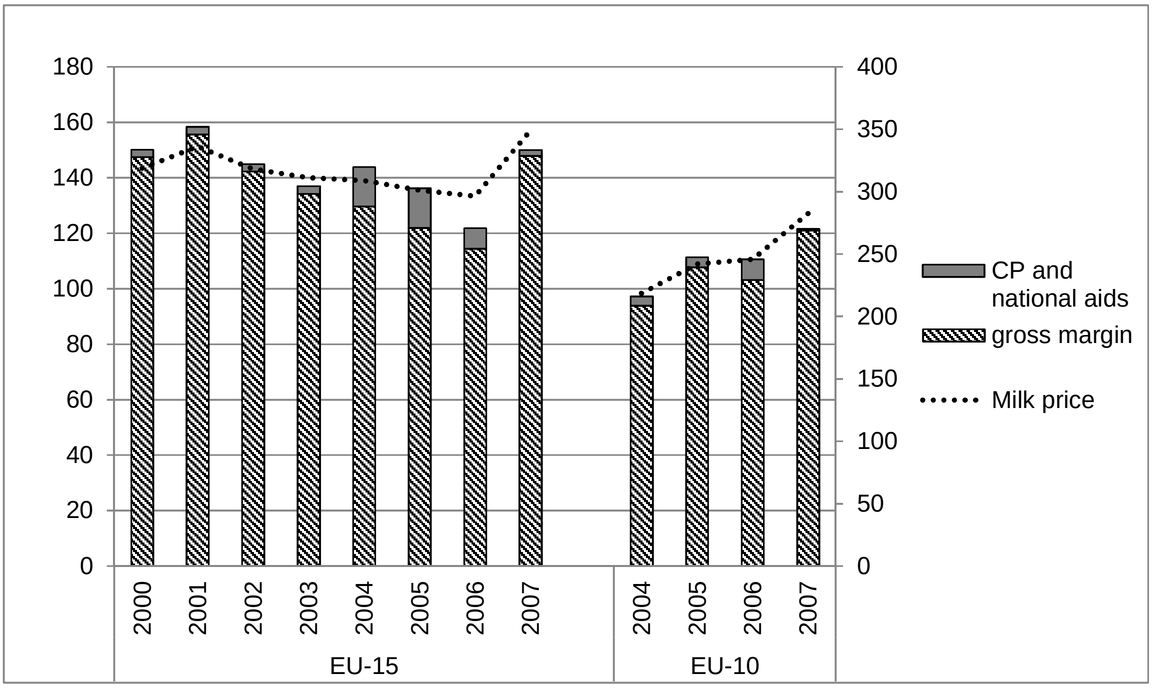
Source: EU-FADN.

From Figure 7.1 it can be seen that on average for the EU-15 and EU-10 the evolution of gross margin per tonne of milk roughly followed the evolution of the milk price. This is still the case when accounting for the coupled supplementary payments made per tonne of milk. As such this shows an indirect effect of

of the Galician Department of Rural Affairs (CMR), there are notable differences which suggest that some costs might be underestimated in the FADN. However, as FADN and CMR have different sampling and different definitions and method of estimation of costs prudence is needed when comparing the results of the two databases.

the CAP policy changes during the evaluation period (lower intervention trigger prices and lower export refunds), which had a negative impact on the milk price in the period 2003-2006.

Figure 7.1 Gross margin over operating costs for EU-15 for period 2000-2007 and EU-10 for period 2004-2007(left axis), and milk price (right axis), €/t



Source: EU-FADN.

7.5.2 Farm development

Income from milk is the result of two factors: the milk margin and milk production per annual work unit. Milk production per annual work unit can be decomposed into average milk yield per dairy cow times the average herd size per dairy farm (which gives the total amount of milk produced per average dairy farm), divided by the annual work unit per average dairy farm (labour intensity). The evolution of herd size has been extensively discussed in Chapter 2 (see Section 2.3) and in the answer to EQ1b (see Chapter 5, Part B). There it has been shown that for the EU-15 the average herd size (per dairy farm) of specialist dairy farms increased by approximately 25% between 2000 and 2007 (for non-specialist dairy farms it has been more or less stable). For the EU-10 it hardly increased over the period 2004-2007. However, these averages mask particular changes in specific Member States. For example, whereas in Belgium the herd size hardly increased, it nearly doubled in Denmark, and whereas herd size declines were observed for non-specialist dairy farms in Estonia, Poland, and Slovakia, in Hungary the herd size of specialist dairy farms doubled in the period 2004-2006, whereas the herd size for non-specialist dairy farms increased by more than 50% in the same period. Moreover, when looking to the herd size distribution within Member States a decline in farm numbers in most Member States at the expense of the smaller herds is observed, whereas larger herds increased their number. From the discussion on EQ1b it became clear that apart from the increase in herd size, milk production per farm also increased because of a steady increase in the milk yields per dairy cow (see Table 5.10).

As Table 7.10 shows, the mirror side of the evolution in farm scale is the change in labour productivity – as measured by indicators such as the number of dairy cows per annual work unit or the amount of milk produced per annual work unit – which increasing between 2000 and 2007. In terms of annual growth rates over the period 2000-2007, the number of dairy cows and milk supply per annual work unit increased by 2.5% and 3.9% per annum, respectively.[54] For the EU-10, the corresponding growth rates

[54] Note that information on farm development or structural change is based on EU-FADN data. As such, it is consistent with the income, margin, revenue and cost figures discussed and is relevant when interpreting its

(measured over the period 2004-2007) are 1.2% and 3.5%, respectively. Note that although there are notable differences in productivity between the EU-15 and EU-10, there is no evident break in the trend of increasing productivity in the EU-15 around 2003, which suggests that the change taking place is not directly related to policy measures.

Table 7.10 Indicators on evolution of average labour productivity on specialist dairy farms

	2000	2001	2002	2003	2004	2005	2006	2007	growth rate[1]
					#dairy cows/AWU				
EU-15	22.8	23.4	24.9	25.5	26.1	25.9	26.8	27.0	1.44
EU-10					8.3	7.9	8.1	8.6	1.19
EU-02								2.7	
					tonnes of milk/AWU				
EU-15	144.9	149.8	162.5	169.1	175.2	176.7	186.8	189.7	2.92
EU-10					43.1	42.2	44.7	47.8	3.51
EU-02								10.6	

Notes: 1) Annualized growth rate based on period 2003-2007 for EU-15, and on period 2004-2007 for EU-10.
Source: EU-FADN.

As indicated above, what happens to the 'average' farm is a reflection of separate developments in farms of different size classes. There is an important and rather consistent relationship between farm size and costs of production. Table 7.11 provides the percentage of the costs that are covered from the revenues earned for the case study regions.[55] As the table shows, the percentage of costs covered by revenues usually increases with the increase in dairy farm herd size. This finding, which can be generalized for all dairy farms, shows the importance of economies of scale in the dairy sector (see also the analysis on structural change provided in the answer to EQ1b in Chapter 5, Part B). Discussion with farmers in the case study areas selected for this report confirmed that increasing farm scale, and thereby reducing the costs of production, is a longer-run farm strategy that many farmers opt for.

decomposition. When comparing this information with the information on structural change from Eurostat's FSS data, the latter source suggests that in reality the process of structural change might have been even faster than is reflected in the EU-FADN data. This even further emphasises the role of the structural change factor in understanding the income evolution.

[55] For this evaluation an extensive research was made on 13 case study regions in 10 EU Member States, including an analysis of EU FADN data, interviews with farmers, extension workers, policy makers, and stakeholders in the processing sector.

Table 7.11 Farm herd size and percentage coverage of costs by revenues for case study regions

	2003						2007					
	>0 <=25	>25 <=50	>50 <=75	>75 <=100	>100 <=150	>150	>0 <=25	>25 <=50	>50 <=75	75 <=100	>100 <=150	>150
France												
West of France	92	93	98	96			82	90	94	97	99	
Franche Comté	85	92	95				80	81	82			
Germany												
Lower Saxony	74	86	94	96	99		82	97	107	110	112	
Bavaria	72	81	86				83	94	98	110		
Spain												
Galicia	111	115	124				120	137	154			
Other	98	114	125	119	108	129	111	114	118	112	118	118
Ireland												
South-West	66	91	99						95			
Other	68	92	105	118	105		63	83	95	103	98	
Italy												
Lombardia	88	108	127		123	137	90	110	115	120	132	138
Emilia Romagne	97	118	120	173	172	138	90	101	101	112	112	110
Latvia	71	92	98	92	94	90	71	92	98	92	94	90
Netherlands												
North		86	88	93	101				95		107	
Other		85	94	101	102			86	97	100	107	109
Austria												
Upper Austria	70	85					77	90				
Other	71	86					71	86				
	2003	2007		2003	2007		2003	2007		2003	2007	
	>0 <=25	>25 <=50	>50 <=75	>75 <=100	>100 <=150	>150	>0 <=25	>25 <=50	>50 <=75	75 <=100	>100 <=150	>150
Poland												
Podladski	96	133					96	133	153			
Other	87	116	130				84	119	124	113		93
England												
North		74	84	91	95	104			89	93	102	108
West		78	89	91	99	105		84	84	91	98	103

Source: EU-FADN, calculations by vTI.

7.6 Revenues and subsidies

7.6.1 Revenues from milk and milk price

The milk margin can be further decomposed in terms of revenues and costs. Table 7.12 provides an overview of the evolution of total milk revenues (including coupled payments, payments from Article 68, and national aids where relevant), measured in euro per tonne of raw milk produced. The lowest revenues were found for Poland, Lithuania and Estonia (average over the whole period was less than €250/t). The highest revenues from milk were realised in Finland, Italy, Malta, Romania, the Netherlands, Sweden and Greece (average for the period 2000-2007 was higher than €330/t). Note that high revenues from milk could be due to a relatively high price received for the milk (e.g. because of the selling of products like PDO cheeses receiving a price premium) as well as due to the importance of coupled payments. There was a modest decline in the milk revenue in the EU-15 since 2003 or 2004, while milk revenues increased since 2004 in the EU-10.

Table 7.12 Total milk revenues for specialist dairy farms (including coupled payments and national aids), €/t

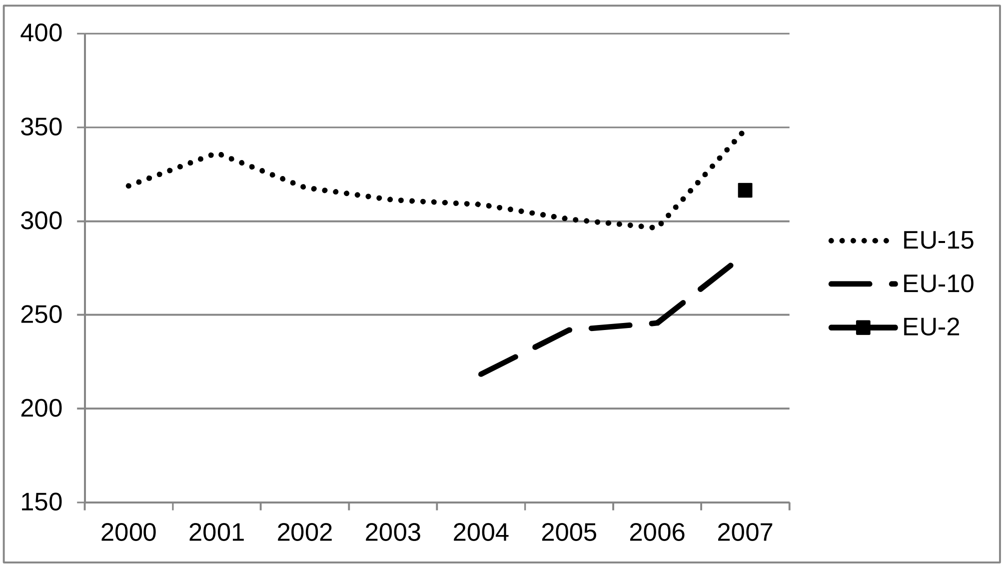
	2000	2001	2002	2003	2004	2005	2006	2007
Belgium	320.93	327.67	303.89	302.79	320.91	318.37	293.14	348.69
Denmark	330.87	349.37	344.14	332.36	334.45	308.62	298.92	333.37
Germany	327.06	329.54	309.84	299.41	307.41	290.25	294.85	381.76
Greece	332.74	316.56	331.51				348.79	
Spain	288.12	318.12	306.75	305.20	323.76	328.15	299.60	353.42
France	318.20	328.89	321.47	317.33	321.86	324.71	291.24	320.02
Ireland	290.03	305.64	282.58	269.26	281.93	265.11	257.97	323.02
Italy	379.35	399.67	399.12	384.50	392.90	433.70	359.77	385.37
Luxembourg	313.82	332.30	329.26	320.89	327.19	303.74	296.57	351.53
Netherlands	322.58	351.24	335.68	323.40	353.46	330.59	334.26	357.89
Austria	303.98	334.91	328.11	293.37	303.31	310.82	323.99	333.14
Portugal	275.76	289.27	293.61	289.60	306.58	299.49	303.53	318.81
Finland	426.59	506.40	446.16	451.94	465.21	430.47	411.74	436.56
Sweden	349.48	323.83	325.54	339.86	342.15	340.73	316.28	322.63
United Kingdom	280.04	309.79	266.08	268.36	277.51	267.06	262.18	315.97
EU-15	321.55	338.96	320.57	313.92	322.96	315.26	303.86	351.10
Czech Republic					250.39	273.51	274.19	301.02
Estonia					235.98	245.43	252.10	262.34
Hungary					265.34	285.66	275.86	292.55
Lithuania					197.43	226.98	222.25	248.60
Latvia					225.11	248.60	268.76	277.27
Malta						370.56	384.90	393.35
Poland					202.39	234.37	245.89	284.42
Slovakia					236.06	251.10	260.38	302.33
Slovenia					268.36	275.50	304.93	276.77
EU-10					221.88	245.49	253.09	283.25
Bulgaria								273.38
Romania								345.17
EU-02								329.19

Notes: Revenues excluding returns from sales of calves and cull dairy cows
Source: EU-FADN.

Figure 7.2 summarises a key factor in explaining the revenues of specialist dairy farms, namely the milk price as received by the specialist dairy farmers. There is a clear distinction between the general trend in the raw milk price received by farmers in the EU-15 and the EU-10. For the EU-15 the milk price declines by about 12% over the period 2001-2006 (-2.5% per year), whereas for the EU-10 the milk price increased over the period 2004-2007 by about 9% per year. Although there is a tendency of the farm gate milk prices in the EU-15 and EU-10 to converge, still the milk price in the EU-15 in 2007 was 24% above that in the EU-10.[56]

[56] The EU-02 average milk price is higher than the one in the EU-10, which might be different from what one would expect. It should be noted that the level of the EU-02 average is influenced by the Romanian specialist farms, which receive a much higher price than the Romanian non-specialist dairy farms. This is because of a quality difference between the milk provided by the two categories of farms. See European Commission (2010b) in particular pages 8-10 and 19 for further details.

Figure 7.2 Raw milk price as received by specialist dairy farmers in EU-15, EU-10 and EU-02 in the period 2000-2007, €/t



Source: EU-FADN.

7.6.2 Coupled direct payments and national aid

The milk revenues presented in Table 7.12 include the revenues from EU coupled payments and national aids. EU coupled payments refer to the dairy premium before it is being decoupled and also include payments based on Article 69.[57] National aids consist of various elements, including the coupled Complementary National Direct Payments (for the EU-10)[58], and additional payments for milk producers (paid from the national envelope), as well as other kinds of state support if any.[59] In total the contribution of these payments varies between 2% and 7% of the raw milk price. Table 7.13 provides details about the composition of these supplementary payments. Their importance gradually declined over 2000 and 2007 for the EU-15, which is mainly due to the conversion of coupled payments (no later than in 2007) into a decoupled payment (inclusion of the dairy premium in the single farm payment or single area payment).[60] Farmers then still receive direct payments, but these can be no longer linked to milk production. As was noted earlier in Chapter 2 (see Section 2.4), the dairy premium was €8.15 per tonne for the calendar year 2004, €16.31 per tonne for the calendar year 2005, and €24.49 per tonne for the calendar years 2006 and 2007. Direct payments in the EU-10 increased after 2004, reflecting that they are gradually phased in.

During the period 2005-2008 Hungary, Lithuania, Latvia and Slovenia (the latter only during 2005 and 2006) paid coupled Complementary National Direct Payments to their dairy farmers. The height of these payments was equivalent with 3% to 15% of the milk price received.

Table 7.14 provides an overview of the subsidies specifically related to dairying, expressed in euro per average specialist dairy farm.

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[57] The actual implementation date of decoupling the payments depends on the Member State. Article 69 payments for dairy were only used Spain.
[58] EU-10 Member States applying CNDPs are Malta, Latvia, Hungary, Lithuania and Slovenia. Of the EU2 also Romania uses national aids.
[59] In particular Finland applies such other national aids under the Articles 141 and 142 of the Act of Accession. In 2007 a new scheme of national aids was negotiated, which allows Finland to continue its national aids to the dairy sector till 2013 (European Commission, 2008).
[60] See next Section on subsidies to dairying for more details on the dairy premium and information at Member State level.

Table 7.13 Average coupled payments and national aid receipts per tonne of milk and per average specialist dairy farm

	2000	2001	2002	2003	2004	2005	2006	2007
Coupled payments (€/t)								
EU-15	0.00	0.00	0.00	0.00	11.00	11.80	5.40	0.10
EU-10					2.00	5.90	10.50	0.00
EU-02								0.00
Coupled payments (€/average farm)								
EU-15	0.00	0.00	0.00	0.00	3499.75	3845.00	1911.53	50.59
EU-10					184.12	521.57	1024.17	0.00
EU-02								0.00
National aid (€/t)								
EU-15	2.70	2.70	2.60	2.70	3.10	2.40	2.00	1.90
EU-10					3.30	3.20	6.90	0.70
EU-02								12.80
National aid (€/average farm)								
EU-15	704.44	725.96	755.27	817.90	985.65	781.40	709.10	690.15
EU-10					298.09	282.98	672.21	68.19
EU-02								255.63

Source: EU-FADN.

Table 7.14 Subsidies with regard to dairy activity, €/farm

	2000	2001	2002	2003	2004	2005	2006	2007
Belgium	0	0	0	0	3,427	6,888	0	0
Denmark	0	0	0	0	8,021	0	0	0
Germany	0	0	0	0	3,207	0	0	0
Greece	0	0	0	0	0	0	4,824	0
Spain	3	19	26	0	5,346	5,026	159	125
France	0	0	0	0	2,944	5,863	0	0
Ireland	0	0	0	25	2,727	7	3	0
Italy	0	0	0	0	3,205	6,208	0	0
Luxembourg	0	0	0	0	3,063	0	0	0
Netherlands	0	0	0	0	6,073	12,399	18,591	0
Austria	0	0	0	0	961	1,959	3,106	0
Portugal	561	496	328	568	3,085	3,601	6,177	2,410
Finland	12,796	13,810	15,182	15,643	20,951	21,156	15,919	16,141
Sweden	0	0	0	0	4,168	5,706	1,0035	0
United Kingdom	0	0	0	0	6,567	0	0	0
EU-15	679	712	687	722	4,370	4,356	2,646	753
Czech Republic	0	0	0	0	0	0	0	0
Estonia	0	0	0	0	0	0	4,745	0
Hungary	0	0	0	0	1,195	2,986	7,322	0
Lithuania	0	0	0	0	578	724	748	0
Latvia	0	0	0	0	2,220	1465	2103	540
Malta	0	0	0	0	0	12952	17588	11766
Poland	0	0	0	0	0	0	0	0
Slovakia	0	0	0	0	0	0	0	0
Slovenia	0	0	0	0	616	1208	2468	0
EU-10	0	0	0	0	307	440	735	57
Bulgaria	0	0	0	0	0	0	0	185
Romania	0	0	0	0	0	0	0	294
EU-02	0	0	0	0	0	0	0	281

Source: EU-FADN.

Table 7.15 shows the share of the dairy premium and the optional additional payments in subsidies on dairying, which aside from the dairy premium also include subsidies on dairy cows, and other subsidies on milk and milk products. As Table 7.15 shows, for Member States that have not yet decoupled their dairy premium, in general the main (to full) part of subsidies in dairying comes from the dairy premium.

Table 7.15 (right part) also provides information on the implicit amount of dairy premium payment per tonne of milk. The amount varies between €7/t and €35/t and increased over the period 2004-2006 for those Member States which not yet have decoupled the dairy premium. On average in the EU-15 the milk price received by specialist dairy farmers declined by €2.43/t in 2004, €7.77/t in 2005, and €4.60/t in 2006 (cumulative decline over this period is about €15/t). As Table 7.15 shows, the dairy premium payments have been on average more than sufficient to compensate dairy farmers for the milk price decline (holds irrespective of whether the payment is coupled or decoupled).

Table 7.15 Share (%) of dairy premium and additional payment in dairy subsidies and amount per tonne of milk

	share in dairy subsidies					€/tonne of milk			
	2000-2003	2004	2005	2006	2007	2004	2005	2006	2007
Belgium	0.00	1.00	1.00	0.00	0.00	12.24	24.05	0.00	0.00
Denmark	0.00	1.00	0.00	0.00	0.00	11.14	0.00	0.00	0.00
Germany	0.00	1.00	0.00	0.00	0.00	10.79	0.00	0.00	0.00
Greece	0.00	0.94	1.00	1.00	0.00	0.00	0.00	20.85	0.00
Spain	0.00	1.00	0.99	1.00	0.00	25.91	21.25	0.70	0.00
France	0.00	1.00	1.00	0.00	0.00	11.56	22.21	0.00	0.00
Ireland	0.00	1.00	0.00	0.00	0.00	10.72	0.00	0.00	0.00
Italy	0.00	1.00	1.00	0.00	0.00	11.06	20.13	0.00	0.00
Luxembourg	0.00	1.00	0.00	0.00	0.00	10.67	0.00	0.00	0.00
Netherlands	0.00	1.00	1.00	1.00	0.00	11.65	23.15	33.59	0.00
Austria	0.00	1.00	1.00	1.00	0.00	10.26	20.25	29.64	0.00
Portugal	0.00	0.52	1.00	0.88	0.00	10.57	22.66	33.53	0.00
Finland	0.00	0.10	0.21	0.00	0.73	11.28	21.96	0.00	8.31
Sweden	0.00	1.00	1.00	1.00	0.00	11.59	16.27	22.54	0.00
United Kingdom	0.00	1.00	0.00	0.00	0.00	10.22	0.00	0.00	0.00
Czech Republic		0.00	0.00	0.00	1.00	0.00	0.00	0.00	32.41
Estonia		0.00	0.00	1.00	1.00	0.00	0.00	14.07	0.33
Hungary		1.00	1.00	1.00	0.00	6.68	14.33	29.26	0.00
Lithuania		0.00	0.00	0.76	0.00	0.00	0.00	8.95	0.00
Latvia		0.20	0.63	0.68	0.00	5.74	11.77	22.30	0.00
Malta		0.00	0.19	0.25	0.00	0.00	7.35	12.69	0.00
Poland		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slovakia		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slovenia		1.00	1.00	1.00	0.00	10.01	19.16	35.62	0.00
Bulgaria					0.00				0.00
Romania					0.00				0.00

Source: own calculations based on EU-FADN.

7.6.3 Decoupled direct payments

Producers also receive payments which are decoupled from production, and as such are not, or no longer, related to milk production.[61] However, these decoupled payments are still part of the income

[61] Partly these originate from the decoupling of the dairy premium and subsequent integration in the Single Farm Payment. Member States decoupling the dairy premium in 2005 were Germany, Denmark, Ireland, Luxembourg and the UK. Belgium, Spain, Finland, France and Italy decoupled the dairy premium in 2006,

dairy farmers receive, and as such are relevant to be taken into account. Table 7.16 provides an overview of the decoupled payments received, expressed as an amount per farm (right part of table), as well as per tonne of milk produced (left part).[62] Note that the payments have significantly increased during recent years. Moreover, when comparing the decoupled payments with the coupled payments and national aids (see Table 7.13), their relative importance is clear: the decoupled payments are much more important than the coupled payments. When expressing them per tonne of milk produced by the specialist dairy farms, they roughly vary in the range of 5%-20% of the average milk price in the EU-15, to beyond 20% of the milk price in the EU-10. Note that the decoupled payments for a large part have no 'origin' or relationship to past dairy activities.

Slovakia, Denmark, the UK, Luxembourg, and Germany belong to the group of Member States having relatively high decoupled payments per dairy farm (average payment per farm in period 2005-2007 was higher than €32,000). Romania, Bulgaria, Latvia, Poland and Lithuania are Member States with a relatively low amount of decoupled direct payments per farm (average in period 2005-2007 was less than €2,000). The differences amounts per farm have a relation to differences in farm scale (approximated by milk output), as well as in differences in payment levels per tonne of milk.

Table 7.16 Total decoupled payments per dairy farm, €/tonne of milk and €/farm

	Decoupled payment/tonne of milk				Decoupled payment per dairy farm			
	2004	2005	2006	2007	2004	2005	2006	2007
Belgium		20	54	51		6,057	17,403	17,392
Denmark		46	58	57		36,458	55,231	56,214
Germany		51	63	62		16,945	22,776	22,424
Greece							7,682	
Spain		1	29	34		127	7,155	7,401
France		1	63	60		182	18,389	18,164
Ireland		52	57	59		13,854	16,559	17,800
Italy		21	54	40		6,288	17,414	13,394
Luxembourg		70	79	79		21,417	24,981	24,917
Netherlands		0	7	40		149	4,198	22,448
Austria		26	24	49		3,099	3,181	6,249
Portugal		7	8	28		1,325	1,426	5,612
Finland		1	61	60		143	12,556	12,405
Sweden		41	38	58		14,398	17,058	25,872
United Kingdom		35	41	37		24,172	33,289	31,077
Czech Rep.	25	26	37	33	11,078	13,433	17,465	20,031
Estonia	24	20	16	20	5,344	6,143	6,909	8,703
Hungary	20	11	18	22	3,320	4,332	6,908	8,165
Lithuania	22	24	26	28	1,407	1,647	1,755	1,999
Latvia	11	15	15	20	999	1,275	1,211	1,497
Malta								7,730
Poland	9	13	17	19	724	981	1,469	1,593
Slovakia	36	46	59	56	28,960	37,047	52,372	60,925
Slovenia				54				4,702
Bulgaria				11				452
Romania				14				249

Source: EU-FADN.

Both EU coupled and decoupled payments, as well as national aids, are directly related to policy measures, and have a significant effect on the income of dairy farmers. Although not all direct payments and aids presented above are related or attributable to dairy, their impact (in percentage of the milk

whereas all Member States had the dairy premium being decoupled from production by 2007 (remaining EU-15 Member States decoupling the dairy premium in 2007 were Austria, Greece, the Netherlands, Portugal and Sweden, whereas in the EU-10 Malta and Slovenia did the same).

[62] It is acknowledged that the decoupled payments are not linked to milk production. Expressing them as an amount per tonne of milk here is only done to make them more easily comparable to the coupled payments and national aids.

price) is so large that – when considered altogether – they are able to compensate for an equivalent milk price decline varying between 5% to 25%. The importance of the payments in income was already discussed in a previous section.

7.6.4 Contribution of subsidies to income

In order to see the importance of all subsidies (including coupled as well as decoupled payments), Table 7.17 gives their share in gross farm income (before taxes and superlevies). The role of subsidies in farmers' gross farm income substantially increased since 2003. There was already an increase in the period 2000-2003, but after 2003 the trend changed into one with a stronger increase. This is clearly related to the policy changes with respect to the direct payments, because payments were increased since 2000 (e.g. dairy premium) in parallel to a gradual decrease in the milk intervention price. An exception was 2007, when shares tended to go down, mainly due to an increase in gross income, while the total amount of subsidies per farm could go up or down. Finland is the EU Member State with the highest subsidy share (average over period 2003-2006 was approximately 50%, because of the high level of national aids). Other Member States with relatively high subsidy shares (i.e. average for period 2003-2006 above 40%) are Latvia, Slovakia, Czech Republic, Sweden, Austria and Luxembourg. The Member State with the lowest share of subsidies in gross farm income is Italy, followed by the Netherlands and Spain (the average share over the period 2003-2006 is less than 15%).

Table 7.17 Share (%) of subsidies in gross income of specialist dairy farms (before taxes and levies)

	2000	2001	2002	2003	2004	2005	2006	2007
Austria	32.2	35.6	35.8	42.4	44.5	43.8	42.0	38.1
Belgium	11.3	14.2	14.8	13.6	17.8	21.1	26.9	22.4
Denmark	18.1	20.2	21.5	20.6	27.8	26.7	29.5	24.7
Finland	72.0	72.1	71.9	69.6	73.4	79.2	75.7	72.4
France	21.7	24.9	27.0	29.7	32.6	35.5	39.9	34.8
Germany	18.3	20.5	26.4	28.1	30.7	33.1	36.6	28.4
Greece	13.6	14.5	32.2	24.0			44.0	
Ireland	14.7	17.8	22.0	19.4	22.4	29.6	35.2	28.0
Italy	9.8	11.3	8.9	8.4	11.3	17.2	20.0	16.1
Luxembourg	30.9	36.7	36.7	40.1	43.2	42.4	44.9	38.6
Netherlands	3.7	5.8	6.7	7.0	12.3	17.0	22.9	18.7
Portugal	17.6	21.8	17.5	18.8	27.5	30.6	38.4	33.3
Spain	5.2	3.6	6.5	7.2	18.7	15.9	17.3	15.8
Sweden	34.9	40.0	39.8	36.0	41.3	49.6	54.3	49.1
United Kingdom	15.5	12.3	17.4	15.2	22.9	29.7	32.1	24.2
EU-15	21.3	23.4	25.7	25.3	30.5	33.7	37.3	31.7
Czech Republic					43.5	49.8	58.1	53.8
Estonia					32.1	37.3	43.1	36.8
Hungary					40.0	32.2	39.6	44.7
Latvia					58.4	49.5	65.1	58.0
Lithuania					34.6	32.8	37.8	29.5
Malta					0.0	54.0	52.4	76.1
Poland					20.2	17.5	26.6	21.6
Slovakia					42.9	55.7	64.7	54.3
Slovenia					37.3	25.3	36.4	37.7
EU-10					34.3	39.3	47.1	45.8
Bulgaria								12.9
Romania								24.8
EU-02								21.8

Source: EU-FADN.

In the period 2003-2006 in the EU-15 the share of subsidies in farmers gross income increased from 25% to 37% (value for 2000 was 20%), whereas for the EU-10 there was an increase from 34% in 2004 to 47% in 2006. In 2007 these shares fell back mainly due to the high milk prices.

7.7 Costs of milk production

The milk margin is a difference between revenues and costs. In this section a further decomposition of costs is provided. Given the aim of the analysis not all costs are discussed in detail and by Member State. In particular attention is paid to total costs of production per tonne of milk, specific costs (and the role of the feed cost item), whereas other costs (e.g. non-specific costs, depreciation, costs associated with external factors, imputed cost for family factors), which are less likely to be linked to changes in EU dairy policy measures, are discussed at the level of EU regions.

7.7.1 Total costs

Table 7.18 starts with providing information on the total costs of milk production, measured in €/t. In subsequent steps the main components of these costs will be further analysed.

Table 7.18 Total costs of milk production for specialist dairy farms, €/t

	2000	2001	2002	2003	2004	2005	2006	2007
Belgium	314	300	301	297	317	308	307	324
Denmark	379	413	391	380	394	386	370	381
Germany	382	406	369	362	343	347	348	392
Greece	286	296	285				397	
Spain	255	254	259	258	258	235	247	283
France	355	365	343	353	352	347	363	374
Ireland	301	317	306	285	305	319	326	355
Italy	413	411	399	371	381	392	345	361
Luxembourg	357	368	378	354	359	362	370	404
Netherlands	353	379	378	364	385	341	351	374
Austria	454	463	458	447	430	442	440	446
Portugal	279	282	278	274	279	270	266	298
Finland	562	590	563	578	608	582	619	643
Sweden	481	449	441	448	469	496	452	450
United Kingdom	345	320	301	300	296	298	300	325
EU-15	367	371	357	350	352	346	349	373
Czech Republic					285	319	333	374
Estonia					235	263	279	289
Hungary					299	300	295	324
Lithuania					173	210	228	237
Latvia					224	258	301	355
Malta								
Poland					192	231	250	270
Slovakia					292	334	521	495
Slovenia					380	362	384	384
EU-10					226	253	271	294
Bulgaria								235
Romania								397
EU-02								361

Source: EU-FADN.

As can be seen the evolution of total costs is different between the EU-15 (which shows an declining trend between 2000 and 2007) and the EU-10 (where total costs increase). Member States with relatively high total costs are Finland, Sweden and Austria (average costs for period 2000-2006 were above €400/t). This group is followed by Denmark, Italy, Slovakia, and Slovenia, which had total costs of €375/t or higher (average for period 2000-2006). The total cost of milk production by specialist dairy farms in the United Kingdom, Ireland, Belgium, and Hungary was around €300/t throughout the period 2000-2007. Bulgaria, Poland and Lithuania belong to the lowest cost producers, having total costs of €235/t or lower. As regards the EU-15 there was no clear change in total costs before and after 2003, except for 2007 when from one year to another costs increased by 7%. In 2007 there was an extreme situation in the world dairy markets, which also had its impact on the EU-dairy sector. This was an external disturbance with no direct relation to policy, however. In the EU-10 total costs increase by about 9% per annum. This primarily related to the entry into the EU and the transition associated with that and not the CAP dairy policy measures.

7.7.2 Specific costs

Costs of milk production can be decomposed into specific costs and non-specific costs. Specific costs include feed costs (purchased plus home-grown), herd renewal purchases, milk superlevy and other specific costs.

Table 7.19 Specific costs for specialist dairy farms, €/t

	2000	2001	2002	2003	2004	2005	2006	2007
Belgium	95.93	89.37	90.84	91.60	95.16	90.81	92.92	101.90
Denmark	112.20	124.53	123.54	120.28	121.85	116.37	115.65	120.03
Germany	99.26	111.88	97.15	101.65	96.98	94.58	98.67	121.60
Greece	172.64	181.26	179.74				278.62	
Spain	118.10	121.72	131.14	129.43	125.17	123.69	120.63	133.51
France	95.15	101.02	92.37	95.66	94.41	90.47	92.75	100.21
Ireland	88.00	94.78	100.88	96.10	97.63	99.64	105.05	112.93
Italy	131.99	139.75	127.58	149.78	150.15	157.20	123.96	139.68
Luxembourg	83.92	83.42	87.75	85.57	86.83	82.78	84.02	87.23
Netherlands	77.09	85.76	88.84	89.55	94.55	83.18	89.41	103.31
Austria	88.19	87.97	94.45	98.61	91.50	88.18	90.82	108.30
Portugal	122.61	138.90	127.45	132.11	131.32	128.64	127.46	149.72
Finland	133.83	153.50	136.49	136.99	138.29	136.93	136.01	141.43
Sweden	115.53	120.66	123.07	119.50	124.03	122.13	117.46	131.95
United Kingdom	108.53	114.92	105.84	104.88	103.39	104.37	113.89	131.62
EU-15	102.46	108.18	104.53	107.77	106.87	103.52	105.60	119.91
Czech Republic					91.90	97.41	99.77	113.38
Estonia					84.17	94.93	99.29	106.62
Hungary					136.64	128.91	106.31	152.82
Lithuania					51.12	59.05	62.28	62.35
Latvia					75.42	87.47	94.93	109.02
Malta						233.71	239.98	264.13
Poland					68.25	76.04	84.94	100.54
Slovakia					114.15	104.25	116.35	127.26
Slovenia					97.78	90.43	97.34	97.87
EU-10					81.66	84.27	88.91	105.60
Bulgaria								119.70
Romania								91.25
EU-02								97.58

Source: EU-FADN , calculations based on DG AGRI cost allocation model.

Table 7.19 gives the evolution of specific costs measured in euro per tonne of milk in the EU for specialist dairy farms over the period 2000-2007.[63] The EU-15 average varies in the range of 100 to 120 €/t, whereas the variation across Member States is much larger. Table 7.19 also shows that there is significant variation over individual Member States. As an example, Lithuania is the Member State having the lowest specific costs in EU-10 and EU-27, whereas Malta has the highest specific costs (about €264/t) in the period 2005-2007. Other Member States have relatively low specific costs are Poland, Latvia, the Netherlands and Austria. Member States having relatively high specific costs are Sweden, Hungary, Spain, Portugal, Finland, Italy, Greece and Malta. The maximum level of specific costs would decline by about €100/tonne if Malta and Greece were excluded. No particular change can be observed for the EU-15 in the period after 2003, year 2007 again being an exception. Specific costs show a steady increase in the EU-10 since 2004, but this is not related to changes in specific policy measures.

With regard to the specific costs category, feed costs in particular are an important item. As can be seen from Table 7.20, feed costs per kilogram of milk were rather stable for EU-15 until 2006, after which they showed a strong increase in 2007. Whereas it is sometimes argued that the increase in feed costs seems to follow the milk price increase, one should be cautious in directly linking them to each other. Feed costs also increase when crop prices increase. As there was not a dramatic increase in milk production, the increase in feed costs is more likely to have been caused by developments in the crop markets. In EU-10 there was an increase in feed costs of about 8% in the period 2004-2006. Feed costs per tonne of milk for the average specialist dairy farm in the EU-15 and EU-10 increased by 15% and 23%, respectively, in the period 2006-2007.

Table 7.20 Average feed costs (including roughage) for specialist dairy farms, €/tonne of milk

	2000	2001	2002	2003	2004	2005	2006	2007
EU-15	80.1	84.8	82.9	85.7	83.9	80.7	82.3	94.4
EU-10					67.1	69.5	72.5	88.8
EU-02								75.8

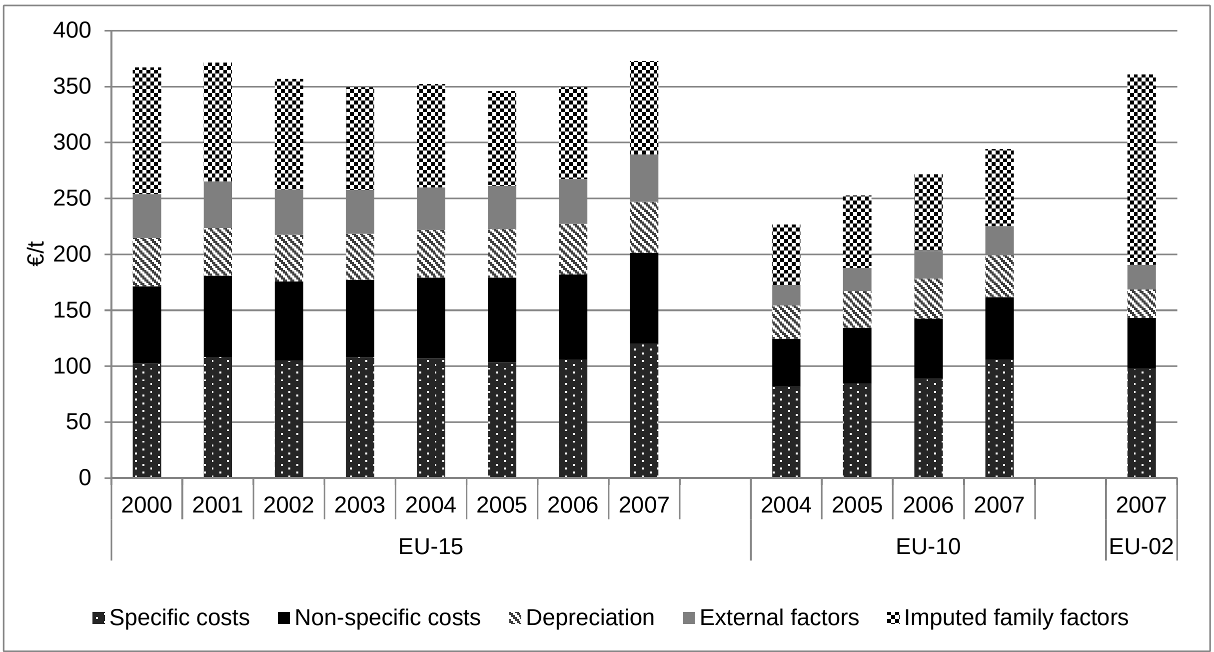
Source: EU-FADN, calculations based on DG AGRI cost allocation model.

7.7.3 Other costs

Figure 7.3 shows the composition and evolution of costs for the EU-15, EU-10 and EU-02 regions. Non-specific costs include costs associated with machinery, building upkeep, energy (fuel, electricity), contract work, taxes (excluding milk superlevy) and other direct inputs (including water and insurance on farm buildings). They have a relatively 'fixed' character and are not likely to have been affected by any of the considered policy changes. The average non-specific costs varied between 58 and 78 euro per tonne for the period observed. Member States having relatively low non-specific costs are Greece, Spain, Bulgaria, Portugal and Poland (the average in period 2000-2007 was €40 or less). Member States with relatively high non-specific costs are the Netherlands, Austria, Germany, Czech Republic, Sweden, France, Slovakia and Finland (the average in period 2000-2007 was €80/t or higher). Non-specific costs show a tendency to increase over this time. Together the specific and non-specific costs represent the total operational costs. Depreciation is also a relatively exogenous cost item.

[63] Because of the difficulty to isolate the costs that can be attributed to dairy in case of non-specialist farms having dairy cows, the analysis will strongly focus on specialist dairy farms. Table 2.23 shows that for many Member States this focus on specialist dairy farms would work since it is these farms which are dominating the supply of raw milk. For calculating costs, revenues and margins for specialist farms, the approach developed by the European Commission (2010) is followed.

Figure 7.3 Decomposition of costs of milk production in the EU



Source: EU-FADN.

The two last cost items regard external and family factors of production. The costs associated with external factors for the EU-15 were on average €40/t, while in the EU-10 and EU-02 it was about half as large. The higher costs in the EU-15 are related to a relative increase in reliance on external factors, which is related to its farm scale, which is relatively large. Of the costs associated with the primary production factor, labour, in particular (imputed) labour costs, is an important cost item worthwhile to be considered further. Getting accurate estimates of the opportunity costs is not trivial, but is important for making a comparison of full costs over Member States. The estimates used in this study are calculated according to the methodology used by the European Commission.[64] The imputed family factor costs (family owned capital and family labour) in the EU-15 for the average specialist dairy farm significantly declined over the period 2000-2007 (-26%), decreasing from €113.1/t to €83.9/t (the annual decline is €4.37/tonne). This is related to the increase in farm scale (see discussion in Section 7.5.2). In contrast, the imputed family costs in the EU-10 over the period 2004-2007 increased by 28%, from €53.9/t to €68.7/t (an annual increase of €4.82/t). The level of imputed family factor costs per unit of milk in EU-15 and EU-10 quickly converge over time.

For no cost item has any evidence been found that costs have been affected in a way that could be linked to the cross-compliance policy, introduced in 2005. From the survey among producers in the case study areas, 220 out of 392 farmers indicated that cross compliance had an impact on costs, but no empirical evidence was found.

7.8 Conclusions

Following the availability of EU-FADN data for all Member States, the period of analysis has been 2000-2007.

Farm income, as approximated by the evolution of net farm added value per specialist dairy farm increased by 21% in EU-15 over 2003-2006 and by 63% in EU-10 over the same period. This not only holds in nominal terms, but for most Member States also in terms of a real increase in income (exceptions are Ireland, Finland, Estonia, Latvia and Slovakia). For non-specialist dairy farms the income increase was relatively lower.

The indicator of the family farm income per family worker showed that, family farm income stayed either stable since 2003 (in nominal terms), or slightly increased (exceptions are Finland and Ireland). The year

[64] See European Commission, 2010a, in particular Annex I, Methodology 2

2007 was unusual year, characterised by disturbances of dairy markets and very high prices for dairy products and raw milk. This is reflected in the sharp increase of the family farm income per family worker.

The relative position of dairy farming with respect to other agricultural sectors can be seen if one compared the FNVA/AWU ratio of specialist dairy farms with this of non-dairy farms. On average the relative income ratio increased between 2003-2006 by about 20% in EU-15 and by more than 40% in EU-10, but results vary over Member States. As regards the EU-15 in Austria, France and Finland the relative income growth in the specialist dairy sector lagged behind. The farm net value of specialist dairy farms in Ireland and in Portugal was about twice of this of non-specialist farms. In the Netherlands and in Spain the earned income of specialist farms developed relatively favourably relative to non-dairy farms. In the EU-10 relative incomes in specialist dairy are lagging behind for Czech Republic, Estonia, and Latvia.

The milk margin indicator (gross margin over operating costs per tonne of milk) showed that gross margin declined in the period 2003-2006. In the same period the producer prices of raw milk in the EU-15 declined, which is correlated with the decline in butter and SMP intervention prices[65] (for the EU-10 milk producer prices increased on average because of the accession of these countries into the EU in 2004). The decline in the milk margin did not translate into a lower farm income, as measured by the FNVA/AWU and FFI/FWU indicators. The reason is because the decline in margin was effectively counteracted by increasing subsidies (consisting of coupled and decoupled direct payments as well as national aids) and by an increase in farm scale and productivity. In detail, the dairy premium was on average more than sufficient to compensate dairy farmers for the milk price decline they experienced. The share of these subsidies in gross farm income (before taxes and levies) substantially increased between 2003 and 2007. During the period 2003-2006 the share of subsidies in farmers gross income increased in the EU-15 from 25% to 37% (value for 2000 was 20%) and in the EU-10 from 24% in 2004 to 47% in 2006. In 2007 these shares fell back because of the high milk prices.

The indicator on the share of subsidies in gross farm income shows that between 2000 and 2007 in the EU-10 dairy farmers were more reliant for their income on coupled and decoupled direct payments and national aids compared to the dairy farmers in EU-15. As regards costs of production, the indicators showed that in particular imputed costs of family factors such as family labour and family owned capital increased in EU-10 between 2004 and 2007, while they remained almost stable or slightly decreased in the EU-15. This is attributed to the initial farm size structure and the relatively lower milk yields compared to the EU-15.

The indicators on farm income show that the 2003 CAP reform on milk and milk products achieved the objective or maintaining or even increasing the farmers' income. The decline in intervention prices for butter and SMP and consequent adjustments in export refunds rates and public buying in had a negative impact on the milk price farmers received in the period 2003-2006, especially in the EU-15. The percentage decline in the milk price received by farmers, however, was less than that of the intervention prices for butter and SMP. The milk price decline negatively affected the gross margin per tonne, but not farm income. Farm incomes developed positively because the dairy premium payments and the decoupled payments more than offset the milk price decline experienced in the EU-15. As such the net impact of the 2003 CAP policy measures for dairy products has been positive and more than sufficient to maintain dairy farm incomes. In the EU-10 the milk price showed an increasing trend, which was also translated in a positive evolution of gross margin.

Dairy farm incomes were not only maintained, but also showed an increase. The actually observed increase in dairy farm incomes (per annual work unit) was partly due to the net impact of the policy measures (affecting income via the milk price and direct payments), with in particular the direct payments playing a crucial role. Dairy farm incomes have also been favourably affected by other factors such as structural change (farm scale increase) and increase in productivity.

[65] See the answer to EQ2 for a more detailed discussion about the linkage of the milk price farmers receive and the CAP policy measures applicable to dairy (see Chapter 6).

Summary of findings for each indicator, EQ3

Indicator	Expected result	Evidence found
Income: Evolution of dairy farm income	Two counteracting effects on income: a negative effect from the expected milk price decline and a positive effect from the increasing dairy premium and other coupled and decoupled payments	Both impacts were observed, but the net impact on income was positive due to the role of the direct payments in more than counteracting the milk price decline and the impact of structural change
Evolution of dairy farm income relative to other farm incomes	It was expected that milk would maintain its position relative to other agricultural commodities.	Dairy farm developed well relative to incomes in other agricultural sectors for 19 out of the EU-25 Member States, but lagged behind the general agricultural income evolution in Austria, France, Finland, Czech Republic, Estonia and Latvia.
Sub-indicator: milk margins	A negative impact is expected due to the decline in milk price	The milk margin indicator (gross margin over operating costs per tonne of milk) declined in the period 2003-2006. In the same period the producer prices of raw milk in the EU-15 declined due to decline in butter and SMP intervention prices. For the EU-10 the milk margin showed a slow increase, following the increase in the milk price for the EU-10.
Sub-indicator: Composition of costs of production for milk	It is expected that the costs per unit of milk will stay stable or decline due to economies of scale and farm size increase	Total costs of production per unit of milk have been roughly stable in EU-15 in the period 2003-2006, but show an increase in the EU-10 (due to increasing labour and feed costs). In 2007 feed costs showed a rapid increase in the EU as a whole.
Sub-indicator: Milk returns	Until decoupling of the direct payments, two counteracting effects are expected: a negative effect from the expected milk price decline and a positive effect from the increasing dairy premium and other coupled payments	Expected results were confirmed for the EU-15, with the net effect being positive. In EU-10 the milk price as well as the direct payments increased in the period 2004-2007.
Sub-indicator: Development in milk farm size, structure and productivity	Continuing increase in farm size as a means to exploit economies of scale was expected	For the EU-15 the average herd size (per dairy farm) on specialist dairy farms has increased by approximately 25% in the period 2000-2007 (for non-specialist dairy farms it has been more or less stable). For the EU-10 it has hardly increased in the period 2004-2007.
Sub-indicator: payments	Direct payments were expected to increase in importance, both absolute and their share in dairy farm income	During the period 2003-2006 the share of subsidies in farmers gross income increased in the EU-15 from 25% to 37% (value for 2000 was 20%) and in the EU-10 from 24% in 2004 to 47% in 2006. In 2007 these shares fell back because of the high milk prices.

8 EQ4: Producers' competitiveness and market orientation

To what extent have the CAP measures applicable to the dairy sector contributed to increasing farmers' market orientation and competitiveness?

8.1 Interpretation and comprehension of the key terms of the EQ4

The key concepts in EQ4 are the market orientation and competitiveness of milk producers.

Market orientation

As explained in the Intervention Logic (Chapter 3), market orientation means the exposure of milk producers to market price signals regarding the quality and quantity of milk demanded by final markets, and their ability to respond to these signals in a rational and unconstrained way. This has several dimensions. First, there is the issue of whether producers can *receive* clear signals from the market, or whether these signals are distorted by policy interventions or elements of market failure that are not related to policies. With respect to the policy changes implemented since 2003, the switch of some income support out of price support into a direct payment for milk producers strengthens the primary role of price as providing a market-determined incentive. A second aspect of producers' market orientation concerns their ability to *react* to market signals without constraints or conflicting incentives. In this respect, the decoupling of the dairy premium and the gradual relaxation of quota limits remove two major constraints on farmers' reactions. As long as the dairy premium remained coupled to milk production, producers could be inhibited from responding to a sustained decrease in the market price by leaving the sector, as they would forfeit their claim to the direct payment coupled to milk. On the other hand, when additional quota is scarce and therefore expensive, producers are unable to take advantage of improved market prices to expand production. The relaxation of these two constraints (output-linked payment and restrictive quota limits) has in theory allowed producers more flexibility to react rationally to market signals.

Market signals concerning quality are transmitted to producers in the first instance via the payment system that determines their milk price when they sell to a dairy (see EQ2). The payment system rewards producers for the fat and protein components of their milk according to their relative value in final dairy products. Historically, the relative value of fat and protein has been partly influenced by EU intervention prices for butter and SMP, although it is argued in EQ2 that this relationship is now much weaker under current intervention rules. Other quality-related price signals include the price differential for organic milk and for PDO/PGI products (niche products). For the main volume of milk produced, however, the extent to which a Member State's milk production satisfies the standard quality criteria depends largely on the share of the milk output that is delivered to dairies. Dairies aim to collect only milk that satisfies standard quality criteria, and they incentivise producers to meet these criteria through adjustments to price.[66]

A further aspect of market orientation, related to the milk-producing sector as a whole, is whether the market for raw milk can receive and react to price signals from world dairy markets. Milk is a perishable and non-tradable product, but processed dairy products are traded on world markets. It follows that the potential link between the domestic market for raw milk and world markets passes via the interlinked

[66] Some milk not delivered to dairies is used for on-farm processing (farmhouse cheeses, ice cream, other specialty high-value products). It could be argued that this activity represents a very high degree of market orientation on the part of milk producers, who in many cases have created their own local market and must maintain close contact with their consumers' requirements to ensure the survival of their business. However, the volume of milk handled in this way is relatively small, and is likely to be unaffected by the policy changes under evaluation. Therefore, it is ignored.

markets for dairy products and back up the vertical supply chain. The extent to which the local supply of raw milk responds to market price signals generated by international dairy product markets is also an element of market orientation. The question here is whether policy changes have reduced the insulation of domestic dairy product markets from developments on world markets, and whether underlying changes in demand and supply on world markets are transmitted to EU producers via prices. Here, it is important to distinguish between short-term price movements generated by volatile world markets (dealt with under EQ2) and medium–term price changes that reflect more durable shifts in the underlying supply and demand conditions.

The EU is typically a net exporter of butter and SMP and uses export refunds and intervention purchasing systems for both products. It is the tariff protection of the EU market that allows a price gap to persist over the medium term, but it is the two instruments – refunds and intervention – that affect the extent to which the price gap smoothes – or blocks - the transmission of price signals to the domestic market. In a situation without either instrument, when the world market price falls whilst the internal EU price remains unchanged, demand for unsubsidised EU exports would fall, and this downward pressure would be transmitted to the domestic market as producers would try to sell more on the home market. Export refunds could be used in this case to compensate for the fall in the world market price, thus allowing export flows to be maintained and hence relieving the pressure on domestic prices. This action would reduce the transmission of the world market price to the domestic market. Another possibility would be for an intervention agency to buy the goods that now cannot be sold on the export market, store them and sell them later when world market prices have recovered. This action also would shield domestic price from the world market price fall. An intervention agency and an export refund system acting together could in theory minimise the cost of this kind of price-smoothing, allowing the price gap to widen and contract in such a way that domestic prices remain more or less constant. In this way, domestic producers would be largely insulated from movements in world market prices.

The existence of a price gap *per se* affects market balance (dealt with in EQ1 and EQ6), but if it remains more or less constant, it does not mask *changes* in world market prices. In practice, for butter and SMP, perfect transmission from world market price movements to domestic price has tended to occur only when world market price for the product concerned is *above* the EU intervention price (see EQ2). By contrast, when world market price is lower than the intervention price, the adjustment of export subsidies (with or without backing from intervention storage) partly insulates the EU price against world market price changes. Changes in the use of these instruments (in particular, scaling down the size of the refund per ton, the intervention price per ton, or the ceilings up to which these measures can be used) will increase the transmission of world market price changes to EU producers.

Competitiveness

Competitiveness is a concept with both static and dynamic aspects, which can be linked to individual dairy farms as well as to their position in the supply chain. When analysing competitiveness it is important to look at longer-run trends in variables rather than at the value of an indicator in a specific year. The competitiveness of the dairy industry as a whole depends on the performance of every segment of the supply chain. In this evaluation question, the focus is on the competitiveness of primary milk production.

From a milk producer's perspective, competitiveness is the ability to supply milk in the location, form and place sought by buyers, at prices that are as good or better than those of other potential suppliers, while at least covering the opportunity costs of resources used. As such, competitiveness depends strongly on production costs relative to those of other market suppliers. This aspect of competitiveness holds in particular for standardized products, where individual producers of an undifferentiated product face competitive suppliers of the same product. Another aspect of competitiveness is the ability to command a higher price by supplying high-value specialty or niche products for which there are no direct competitors.

Furthermore, competitiveness can refer to the ability of one commodity sector to compete for resources with other agricultural commodity sectors. The most important factor here is the profitability of milk production relative to other commodity outputs. Finally, a further aspect of competitiveness is whether a production sector in a country is able to compete on cost and quality with similar sectors in other countries. For many less perishable dairy products, the market is global and hence the unit cost of milk produced in the EU relative to that of competitors elsewhere in the world is very important.

8.2 Methodology used for answering EQ4

The methodology used to answer this evaluation question involves, for the most part, comparing the values of the indicators for the pre- and post-2003 periods. For these comparisons, the earlier period usually extends back only to 2000. When the indicator is in the form of a trending variable, the period preceding the evaluation period is extended further back into the second part of the 1990s, if possible, so that any can be clearly identified. For one of indicators, use is made of the information gathered from the producer surveys. Producers were asked whether they changed their behaviour in response to a policy change. The benchmark or counterfactual is implicit in the question: an answer 'no' means that their behaviour would have been the same also in the absence of the policy change.

8.3 Judgement criteria, indicators and information sources used for each indicator

Thirteen indicators are used, each of which provides information on a specific aspect of market orientation or competitiveness. Each indicator is described, and they are then summarised in Table 8.1.

Market orientation

Exposure to market signals. The share of milk production delivered to dairies is used as an indicator of the producers' exposure to market signals. The choice of this indicator is based on the role played by the payment system (see EQ2) in providing price incentives to farmers regarding the quantities of fat and protein, and other attributes of milk, that are demanded by the market. The channel for transmitting price signals from international markets to milk producers, if it is functioning well, passes through processing companies who sell in national and export markets. It is true that direct sales respond to price signals on local markets, and these markets tend to be somewhat distinct (concerning the product and the clientele) from the wholesale and national-retail markets. This aspect of market exposure is not analysed.

Farmers' response to price signals (three indicators).

- Farmers' ability and willingness to respond to price changes is assumed to increase once the dairy premium is decoupled from milk production. This payment had to be decoupled from milk production and included in the Single Farm Payment by the start of 2008. However, Member States could choose in which of three years this decoupling occurred. Qualitative evidence from the milk producer surveys is used to gain insight into whether decoupling of the dairy premium changed producers' supply response.
- Farmers' willingness to respond specifically *to price falls* or to other medium-term disincentives to remain in dairying by closing down their dairy operation is assumed to increase once the dairy premium is decoupled from milk production. Therefore, we look at whether the downward trend in the number of dairy herds increased after decoupling occurred.
- Farmers' ability and willingness to respond specifically *to price increases*, or to other medium-term disincentives to remain in dairying, by increasing their production depends on their ability to acquire more quota. Here, evidence on how policies influenced the pattern of under- and over-use of national quota is examined. When a Member State is no longer filling its quota, and hence an individual producer's over-quota supply is no longer penalised, individual producers can more easily acquire quota (price is lower) or take advantage of 'free' quota in the system to produce beyond their limit with a low risk of having to pay the superlevy. Figures on under- and over-quota production at Member State level and responses to the producer survey are considered.

Exposure to world market price signals (three indicators).

In order to measure to what extent market prices for milk transmit world market price signals, we use three indicators:

- the evidence presented in EQ2 on the link between volatility in world market and EU milk prices (short-term price movements),
- price support as measured in EQ2 (stability of the price gap), and

- the use of export refunds during the evaluation period (a measure that can be used to prevent the (full) transmission of world market price falls to the domestic price).

Competitiveness

Production cost. If production cost is falling, then clearly the competitiveness of the milk-producing sector is increasing, *ceteris paribus*. Therefore, the cost per ton of milk produced (including the imputed costs for family labour, owned land, and capital) is a long-term indicator in the sense that only in the long term are the fixed family-owned factors variable. However, this is not a conclusive indicator, because clearly *ceteris paribus* does not hold over time. This cost has to be related to the price of milk farmers receive: if market price is falling faster than cost is falling, or rising less rapidly than cost is increasing, then competitiveness is decreasing. As a measure for assessing the competitiveness of dairy farms in the short run (assuming family labour and land to be fixed factors, having little alternative possibilities to be employed) is gross margin over operating cost per ton of milk. Operating costs consist of specific costs (e.g. feed, herd renewal) and non-specific costs (e.g. machinery and building upkeep, energy, contract work, insurance), and exclude external factors (e.g. depreciation, wages paid, rent paid) and imputed family factors (e.g. family labour, family owned capital). The percentage of farms that realise a positive net profit is also an indicator of the longer-term competitiveness of the sector. To capture these various aspects of cost-competitiveness, the following indicators are used:

- Cost per tonne of milk production
- Gross margin over operating costs
- Percentage of farms with positive net profit

Competitive position within EU agriculture. To assess the strength of the dairy sector relative to other agricultural, the profitability of the dairy sector relative to that of other agricultural sectors is analysed. The indicator adopted is farm net value added per annual work unit relative to that of other agricultural sectors.

International competitiveness (two indicators). The evolution of milk production cost in the EU dairy sector relative to competitors in the world is examined. A second indicator relates to the attractiveness of the EU market for imports, which is assessed by examining the fill rates of TRQs for dairy products.

Table 8.1 summarises these indicators, along with the data required and the source used.

Table 8.1 Indicators, data requirements and information sources for EQ4

Indicator	Data requirement	Information sources
Market orientation		
Producers' exposure to market signals		
Share of total milk delivered to dairies	Data on deliveries and production of milk	EU-FADN, Eurostat
Producers' response to decoupling of payments		
Stated reaction of producers	Farmer responses to survey questions	Producer survey
Willingness to respond to price falls	Number of dairy herds	Eurostat
Ability to respond to price increases	Under-use of national quota	DG AGRI
Exposure of markets to world market prices		
Link between domestic & world market price volatility	Evidence presented in EQ2	
Price support above world market levels	Evidence presented in EQ2	
Use of export refunds	Table 2.48	

Table 8.1 (continued) Indicators, data requirements and information sources for EQ4

Competitiveness		
Production cost		
▪ Cost per tonne of milk ▪ Gross margin over operating costs ▪ Share of farms with positive net profit	Data on revenues, specific and non-specific costs associated with dairy activity	EU-FADN
Competitive advantage relative to other sectors, countries		
Profitability relative to other commodity sectors	Farm net value added per annual work unit of specialist dairy farms relative to other farm types	EU-FADN
Net economic margin (after own factors)	Sales of milk and milk products, operating costs, depreciation, external factors, imputed unpaid family factors	EU-FADN
International competitiveness		
EU milk production cost relative to main international competitors	Data on costs of milk production in non-EU countries	IFCN, IDF
Competitiveness on the home market – fill rates of TRQs	Evidence presented in EQ10	

The judgement criteria involve, in each case, an assessment of whether the indicator behaves as would be expected, given the policy change that is linked to it according to the intervention logic. When it is possible to link the behaviour of the indicator to changes in a particular policy instrument in a particular year, then the year of the change marks the start of the post-change period, to be compared with years prior to it. For some indicators, it is the general trend in their value after the 2003 reform relative to the trend in the preceding period that is of interest. In these cases, the judgement criterion is whether the trend changed as expected, according to the intervention logic.

8.4 Evidence on market orientation

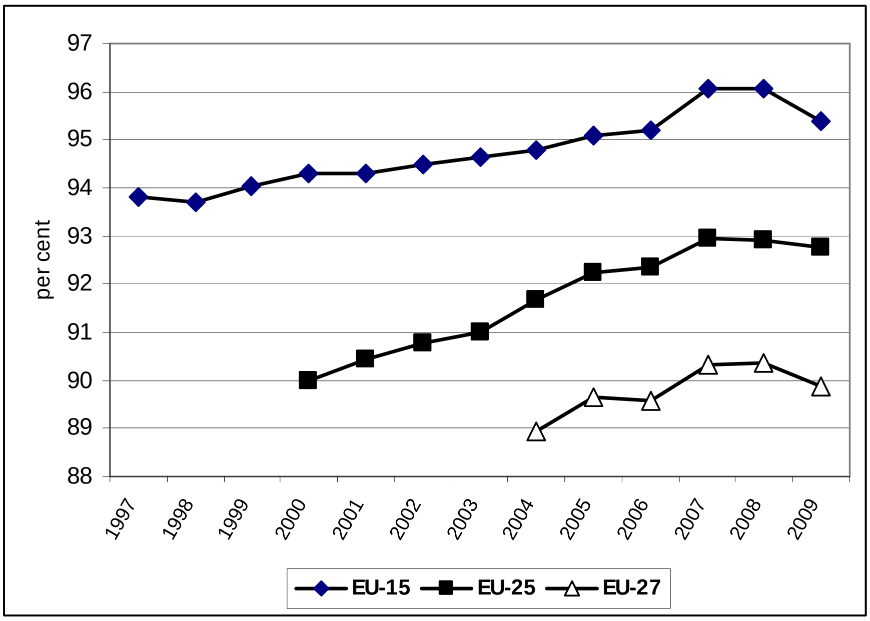
8.4.1 Share of milk delivered to dairies

The share of all cows' milk produced that is delivered to dairies increased gradually between 2003 and 2008 (see Figure 8.1). In 2009 (year of a sharp fall in milk price, the so-called 'milk crisis'), this share fell back a little. However, there is no reason not to expect that the former level will be regained when normal conditions are restored. It is possible to compare the post-2003 situation with previous years for EU-15 only. Despite an initially high delivered share (over 94% in 2002), the share continued to increase after 2003. This supports the hypothesis of increasing exposure to market signals as they are channelled via the payment system of dairies. It is also clear that the two successive enlargements reduced this indicator to well below its level for EU-15 in the late 1990s. However, what is important here is that the upward trend throughout the post-2003 period (except in 2009) is observed for EU-25 and EU-27. In fact, the gap between the delivered share in EU15 and EU25 was closing, indicating that (not surprisingly, given the 'catching-up' process) the share is rising faster in EU-10.[67]

Nevertheless, the evidence is inconclusive as to the role played specifically by policy changes in the increasing exposure of producers to market signals as passed on to them by dairies. The rather smooth trends shown in Figure 8.1 do not suggest any particular policy-related stimulus, and the sharper increase between 2006 and 2007 is also hard to relate to any specific policy change. All that can be said is that the trend has been rising throughout the period shown, except in the three last years.

[67] In 2007, the 'peak year' for the deliveries share, the figures were: EU-15: 96.1%, EU-10: 76.2%, EU-2: 30.6%.

Figure 8.1 Share of total cows' milk production delivered to dairies, EU-15, EU-25, EU-27



Source: Eurostat.

8.4.2 Producers' response to decoupling of the dairy premium

The survey of milk producers in 13 case study areas (in each area, 30 active dairy farmers and up to five who stopped milk production during the observation period) yielded over 450 respondents. The sample selection process offers no guarantee that the sample is representative. However, the survey provides some insights, especially when the answers are close to unanimous.

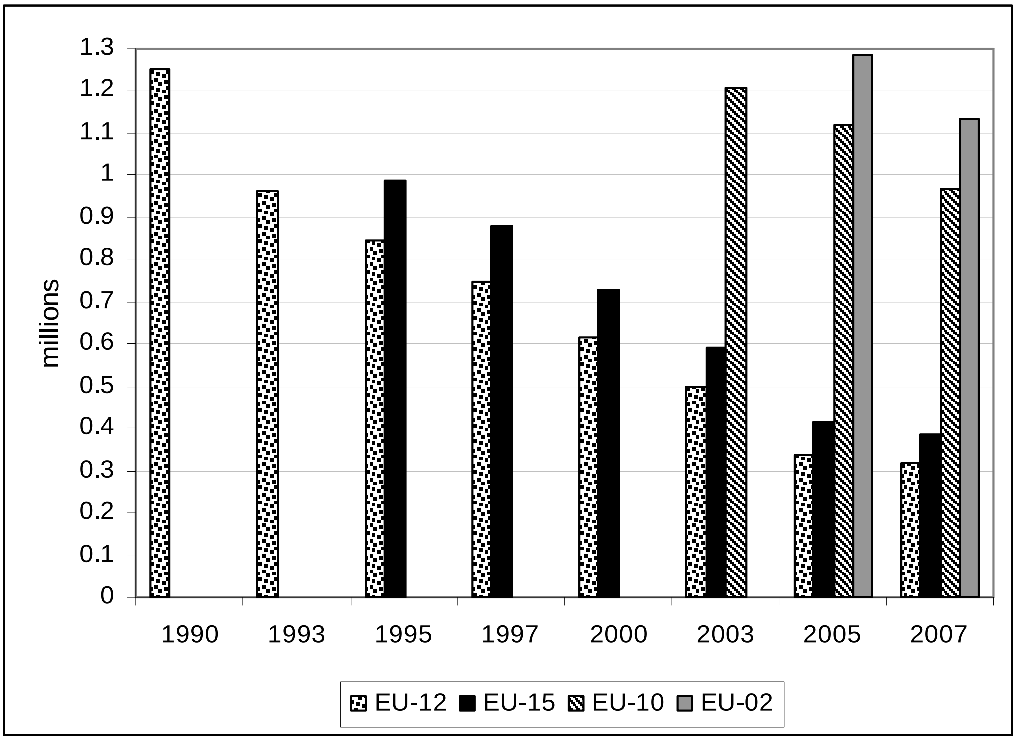
The active dairy farmers were asked about their response to both the introduction of the dairy premium and its decoupling. First, the overwhelming majority said that the premium was not relevant to their production decisions.[68] Second, they generally considered that the decoupling of the premium also was not relevant for their level of production.[69] Among the small number of respondents who had already ceased milk production, the year of departure was not linked to decoupling and the reasons given tended to be linked to low prices and absence of a successor. It must be stressed that the number of former milk producers was particularly small, and that from the statistical point of view the summary of their answers cannot be relied upon.

In summary, one might have expected that producers who perceived the dairy premium to be coupled to milk production, or those who wondered about whether it might be rebased according to a later year, would - *after* its merging with the SFP - have felt freed from the incentive to produce milk in order to receive the premium. However, this was not the case. Farmers either saw the decoupling as irrelevant or responded to decoupling with an increase in milk production. This explanation fits with the observation that milk production requires specific investments, implying that once a farmer has committed these assets, he is not inclined, at least in the short run, to switch to other activities.

[68] For a small minority, it led to an increase in production, suggesting an irrational perception that it was coupled to current output levels rather than to the amount of quota held at the end of the respective quota year.
[69] Here too, those who gave a different answer mentioned that it led to an *increase* rather than a decrease in production.

8.4.3 Producers' response to price falls

Figure 8.2 Number of EU dairy herds, 1990-2007



Notes: In 1990, the figures for Germany are for the 11 Länder, thereafter for the 16 Länder. Figures for Germany for 1995 and 1997 are estimates, obtained by linear interpolation.
Source: Eurostat.

Figure 8.2 shows the evolution of dairy herd numbers (measured as farms with dairy cows) in EU-12, EU-15, EU-10 and EU-02 between 1990 and 2007. Although EU-12 as a group of countries has no interest *per se* in this report, it is included in the figure in order to extend the trend back to 1990. The graph shows a long-run secular decline in the number of herds in EU-12/EU-15, which is also reflected in the shorter time series for EU-10 and EU-02. As EQ1b (Chapter 5) reports in detail, this has been accompanied by a steady growth in herd size, which explains why the number of dairy cows has been declining much more slowly than the number of herds.

The smooth downward trend in herd numbers in EU-15 accelerated strongly between 2003 and 2005, and then slows down during 2005-07. The *average annual* rates of change for EU-15 between each of the Farm Structure Surveys are: 1995-97: -5.6%, 1997-2000: -6.0%, 2000-2003: -6.7%, 2003-2005: -16.3%, 2005-2007: -3.5%. In fact, between 2003 and 2005, 30% of dairy herds (178 thousand herds) in EU-15 disappeared. This sudden acceleration in the trend supports the view that the 2003 dairy reform package, with its promise of new policy instruments, price falls, cross compliance requirements and its greater general emphasis on market orientation, provided a stimulus for producers who were less committed to milk or whose herds' performance was marginal to leave the sector rapidly, even before most of these measures had been fully implemented. The slowing down of the decline in 2005-07 suggests that the higher rate of exit between 2003 and 2005 may indicate that for some herds, cessation of production that would normally have happened later was simply brought forward by a few years. However, it should also be noted that between 2005 and 2007, *increases* in the number of herds were observed in four Member States (+2.9% in Italy, +12.4% in Luxembourg, +4.2% in the Netherlands and +7.0% in the UK). This is the first time that net increases in herd numbers were observed at Member State level between consecutive Farm Structure Surveys during the period from 1990 onwards. We note the these increases occurred *before* the 2% increase in quota for most Member States in April 2008, and is therefore most likely to be due to the combination of lower quota prices/greater quota availability in some member States.

8.4.4 Ability to respond to price increases

Figure 2.7 presents the extent of over-run and under-use of quota across the EU. It shows that from 2004/05, the EU as a whole was in a situation of net under-use of quota, although a handful of Member States still exceeded their national quota ceilings. By 2008/09, not only was the net under-use more than 5 million tonnes, there was virtually no over-run at Member State level. This helps to explain how the increase in dairy cows in 2007-2008 in some Member States, shown in Table 5.5, could be possible. Moreover, it is worth noting that there was an increase in milk yield at EU-27 level (Table 2.4), which could well indicate a (market-oriented) supply response to much higher prices – one that was facilitated by the fact that production levels were below quota ceilings. Of course, annual weather variations might also be a causal factor, so this interpretation of the evidence needs to be treated cautiously.

8.4.5 Exposure to world market prices

Table 6.3 shows that the price gap for the basic products butter and SMP fell from an average of 91% of the world market prices in the period 1997-2003 to 52% in 2004-2006. The average during 2007-2008 was just 13% (and for some sub-periods in this interval, it disappeared) but it then rose to 34% in 2009. Overall, internal prices were closer to world market prices after 2003 than before the reform, and part of that convergence (that part which is observed in 2004-2006 and again in 2009) can be attributed to the lower level of market price support due to lower intervention prices. Export refunds continued to be used until 2006 more or less as before 2003 in order to dispose of excess supplies, until the higher world prices in 2007-2008 caused them to be suspended (Table 2.48).

The evidence on price volatility presented in EQ2 (Chapter 6) shows clearly that short-term price movements within the EU were strongly linked to world market price volatility during the years 2007-2008 (see EQ5). In this period, export refunds and intervention (at its new lower safety-net level) became ineffective as domestic price stabilisation instruments as the price gap for butter and SMP was virtually zero. Here we see very clearly the separate roles of import tariffs and export refunds as insulating border instruments. Tariffs (which allow the import entry price to move up and down with world market price but at a much higher level) still performed their role of restricting imports onto the EU market (except imports permitted within TRQs) but export refunds became irrelevant

This is further evidence of the high degree of market orientation achieved during this short period. However, it was due to external developments rather than EU policy changes.

8.5 Results on competitiveness

8.5.1 Cost of production

Table 8.2 shows the average total cost of milk production by EU Member State. Total costs in EU-15 remained relatively stable over the period 2000-2007. The EU-15 average for the period was €358/t. Average cost was above this level in 2000 and 2001, and again in 2007, whereas it remained below average over the four years 2003-2006. The pattern of annual cost relative to the average for the period was also observed at Member State level. One should be cautious about attaching too much significance to the slight decrease in EU-15 costs in 2004-2005, relative to 2000-2001, since the EU-FADN sample does not contain an identical set of farms each year, and an unknown share of this variation could be due to changes in the composition of the sample.

There are also large differences in average cost between Member States, and these differences persist over the entire period despite changes in the sample composition. The highest-cost producer is Finland, with average cost at 50-80% above the EU-15 average (the next highest average-cost countries are Sweden and Austria), and the lowest-cost producer is Spain, with average cost at 25-35% below the EU average (the next lowest-cost producer is Portugal).

Regarding the impact of policy measures on average cost, this evidence supports the weak conclusion that the policy changes post-2003 did not increase milk production costs in EU-15 (which was not expected anyway) and that there is no discernible impact on cost-competitiveness.

Table 8.2 Total cost of milk production for specialist dairy farms, €/t

	2000	2001	2002	2003	2004	2005	2006	2007
Belgium	314	300	301	297	317	308	307	324
Denmark	379	413	391	380	394	386	370	381
Germany	382	406	369	362	343	347	348	392
Greece	286	296	285				397	
Spain	255	254	259	258	258	235	247	283
France	355	365	343	353	352	347	363	374
Ireland	301	317	306	285	305	319	326	355
Italy	413	411	399	371	381	392	345	361
Luxembourg	357	368	378	354	359	362	370	404
Netherlands	353	379	378	364	385	341	351	374
Austria	454	463	458	447	430	442	440	446
Portugal	279	282	278	274	279	270	266	298
Finland	562	590	563	578	608	582	619	643
Sweden	481	449	441	448	469	496	452	450
United Kingdom	345	320	301	300	296	298	300	325
EU-15	**367**	**371**	**357**	**350**	**352**	**346**	**349**	**373**
Czech Republic					285	319	333	374
Estonia					235	263	279	289
Hungary					299	300	295	324
Lithuania					173	210	228	237
Latvia					224	258	301	355
Malta								
Poland					192	231	250	270
Slovakia					292	334	521	495
Slovenia					380	362	384	384
EU-10					**226**	**253**	**271**	**294**
Bulgaria								235
Romania								397
EU-02								**361**

Source: EU-FADN.

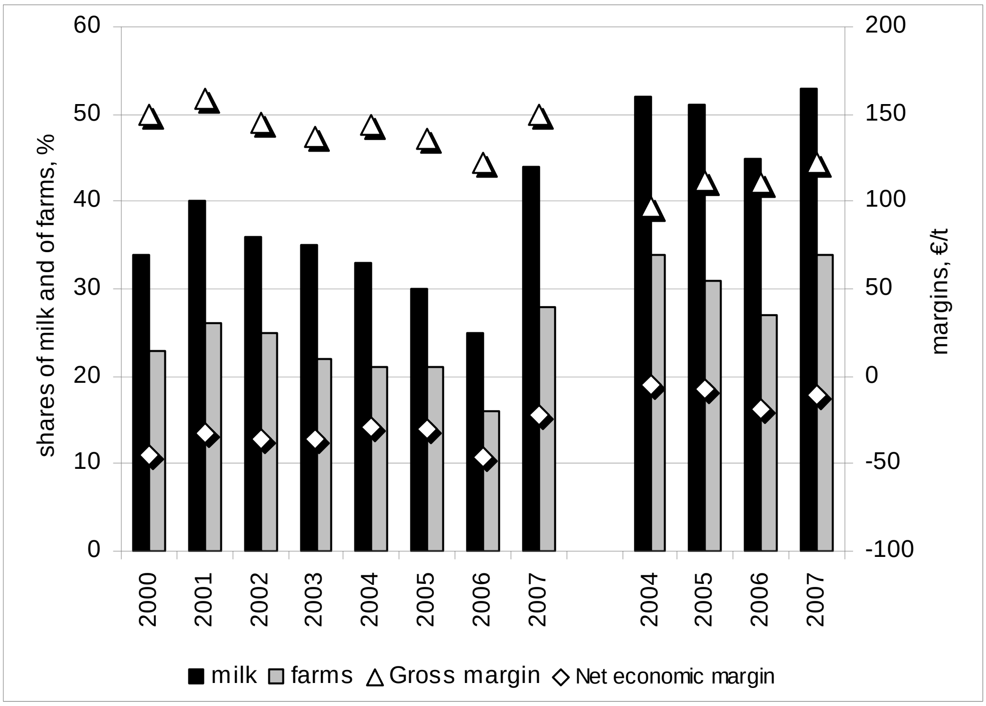
By contrast, average production cost in EU-10 followed a marked upward trend between 2004 and 2007, but was still well below the EU-15 level in 2007. Average production cost in EU-10 increased by 30% between 2004 and 2007 (from €226/t to €294/t), with only Slovenia not sharing this trend. Given this strong increase, one is on safer grounds concluding that it is a real effect and not due to sampling variation. However, it is due largely to the post-accession transition to EU price levels throughout these economies, and not to changes in CAP dairy measures.

8.5.2 Gross margin and share of 'profitable milk'

Figure 8.3 presents some indicators of profitability for specialist dairy farms. Gross margin is equal to [(milk revenue + direct payments related to dairy (e.g. Article 68) + national aids to milk) minus (specific costs + non-specific costs)] per tonne of milk, whereas net economic margin is gross margin *less* costs paid to external factors (rent, wages), + costs calculated for imputed family factors (family labour and own labour unpaid costs)] per tonne of milk. Once the dairy premium is merged with the SFP, it no longer shows up in these calculated margins as – theoretically – it is no longer related to the dairy activity.

The average gross margin in EU-15 showed a declining trend in the period 2001-2006, but increased in 2007 due to higher milk prices (see EQ2). The fall from 2001 to 2003 was as steep as that from 2004 to 2006. By contrast, the gross margin in EU-10 rose from 2004 to 2007. There is a strong contrast between EU-15 and EU-10 in that, despite opposite trends in gross margin, the trends in net margin and in the proportions of milk coming from farms with a positive net margin are similar, as is the share of farms with a positive net margin. This indicates that fixed and imputed costs of family owned factors were increasing in EU-10 faster than gross margins. The margins achieved in EU-10 are on average below those of the EU-15, but they are converging over time with those of EU-15 (see also Section 7.5).

Figure 8.3 **Share of milk from farms (and share of farms) having a positive net economic margin (left side: EU-15, right side: EU-10); gross margin and net economic margin (right axis)**



Notes: EU-15 excludes Greece, Finland and Sweden, and EU-10 excludes Malta and Slovakia because data are lacking. Data for 2008 are currently unavailable.

Source: EU-FADN.

The evidence in Figure 8.3 shows that the share of farms with profitable milk production and the share of milk coming from such farms decreased after 2003 and this trend was reversed only in 2007 when EU milk prices rose temporarily, in line with the surge in world market prices. This result indicates that the uncompetitive segment of the EU's milk-producing capacity increased its share immediately after the reform. Thus, although the milk price fell, this fall did not stimulate parallel cost reductions that would have signalled an increased ability to compete in less protected milk markets.

This result does not mean, however, that the share of marginal *farms* increased, since the indicators relate to the *milk-producing* activity and do not take into account the decoupled dairy premium, which contributes to the overall profitability of the farm but which is not attributed to milk production in the EU-FADN data base.

8.5.3 Profitability of specialist dairy farms relative to other farm types

The evidence on relative profitability at Member State level is given in Table 8.3 and Figure 8.4. Averaging over the period 2000-2008, only Austria, Finland and France among EU-15 Member States have a ratio less than 1, implying that milk production so less profitable than other commodity sectors. For all other EU-15 Member States, milk is a relatively profitable and competitive sector. In the EU-10, milk production is relatively less profitable and hence less competitive than other sectors in the Czech Republic, Latvia, Lithuania and Slovakia, and this is also true in EU-02. Of course, when milk production is a relatively less profitable or competitive activity, it does not automatically imply that it will be out-competed by other commodities and will decline. This is because certain areas (e.g. hilly pastures) are only suitable for grazing animals and have no alternative uses. It should also be noted that this relative profitability indicator is not influenced by dairy policy measures alone but rather in conjunction with policies targeting other commodity sectors, and to a range of other features determining competitive advantage.

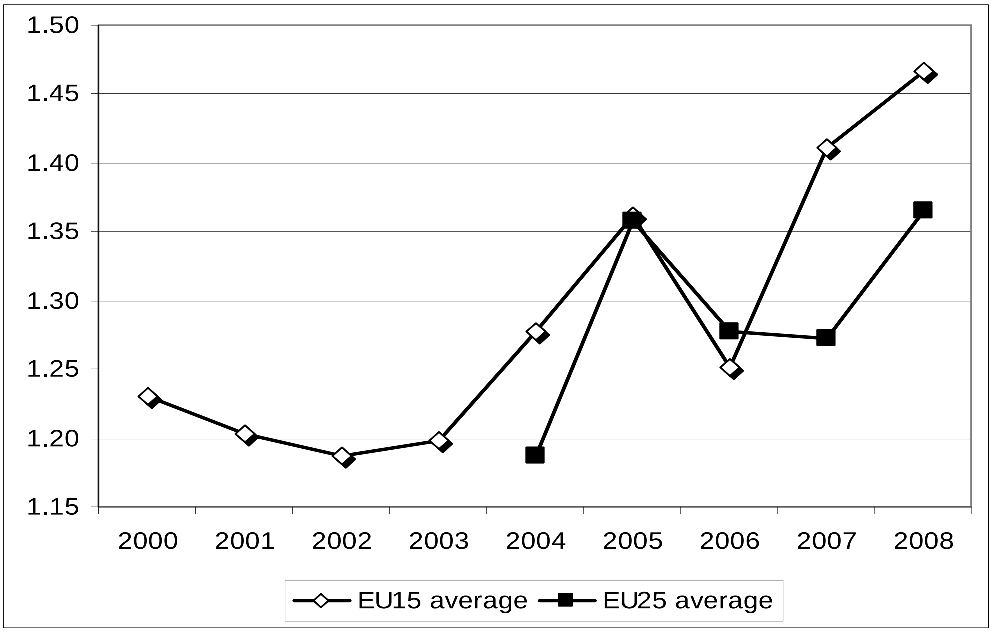
Table 8.3 Profitability of dairy farming relative to other agricultural sectors, 2000-2008, FNVA/AWU

		2000	2001	2002	2003	2004	2005	2006	2007	2008
EU-15	Austria	0.84	0.84	0.85	0.73	0.74	0.81	0.84	0.81	0.88
	Belgium	0.90	0.96	0.98	0.89	0.97	1.09	1.02	1.31	1.24
	Denmark	0.94	0.85	1.37	1.32	1.29	1.16	1.20	1.66	1.90
	Finland	0.77	0.84	0.82	0.93	0.98	0.93	0.81	0.70	1.21
	France	0.84	0.80	0.86	0.83	0.83	0.92	0.81	0.81	0.89
	Germany	1.02	0.98	1.07	0.94	0.95	1.08	1.09	1.30	0.90
	Greece	1.34	1.25	1.09	1.41			1.48		
	Ireland	2.05	2.36	1.94	2.05	2.11	2.10	1.83	2.49	2.36
	Italy	1.51	1.75	1.54	1.47	1.60	1.77	1.89	1.67	
	Luxembourg	1.01	1.09	1.06	1.26	1.09	1.17	1.19	1.35	1.66
	Netherlands	1.39	1.21	1.45	1.24	1.45	1.56	1.29	1.83	1.56
	Portugal	2.30	1.55	1.52	1.68	2.07	2.15	1.67	2.10	2.12
	Spain	0.79	1.05	1.07	1.05	1.43	1.97	1.64	1.73	1.87
	Sweden	1.61	1.05	1.15	1.17	1.09	1.13	1.18	0.80	1.10
	United Kingdom	1.14	1.47	1.03	1.00	1.29	1.22	1.06	1.20	1.14
	Average EU-15[1]	**1.23**	**1.20**	**1.19**	**1.20**	**1.28**	**1.36**	**1.25**	**1.41**	**1.35**
EU-10	Cyprus									
	Czech Republic					0.86	0.97	0.92	0.86	0.91
	Estonia					1.48	1.09	1.00	0.89	1.34
	Hungary					1.00	1.20	1.27	1.10	1.03
	Latvia					1.12	1.15	0.91	0.74	0.74
	Lithuania					1.03	1.19	1.08	0.72	0.74
	Malta						1.62	1.43	1.39	2.15
	Poland					1.13	1.33	1.44	1.37	1.35
	Slovakia					0.31	0.80	1.10	0.74	0.76
	Slovenia					1.29	2.82	2.71	1.69	1.84
	Average EU-10[1]					**1.03**	**1.35**	**1.32**	**1.06**	**1.21**
EU-02	Bulgaria								0.88	0.86
	Romania								1.32	0.56

Notes: 1) Arithmetic averages.

Source: EU-FADN.

Figure 8.4 Profitability of dairy farming relative to other agricultural sectors, 2000-2008, FNVA/AWU



Source: EU-FADN.

8.5.4 Relative cost of milk production of the EU with respect to key competitors

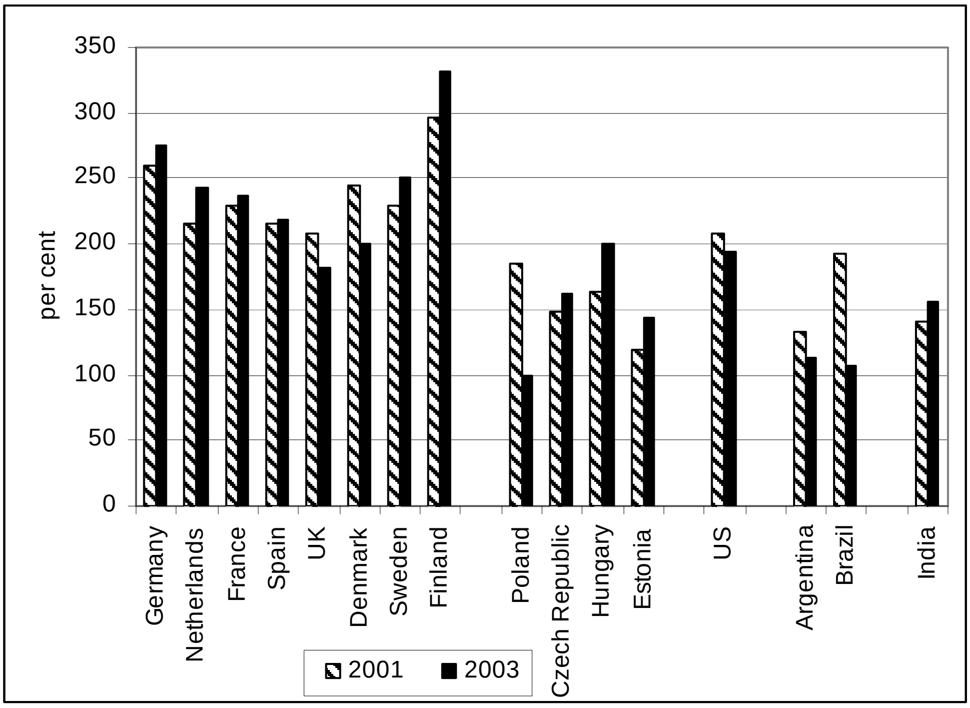
The most comprehensive information on milk production costs worldwide is collected by the IFCN (International Farm Cost Network), but it is not in the public domain. Therefore, we have had to rely on secondary publications that have used these data. Data for two sub-periods have been found: for the years 2001 and 2003, and for 2007. It is regrettable that the presentation of the data for these two sub-periods in the sources used does not allow a more rigorous comparison to be made. However, we present the data that was found and draw some very tentative conclusions.

Figures 8.5 and 8.6 provide information about the cost competitiveness of EU milk production compared to other key production areas, based on calculated total costs of production for milk producers in 2007. The primary information comes from the IFCN, in which 134 typical dairy farms[70] from 44 countries are analysed.[71]

Figure 8.5 shows the milk production costs of a number of countries, relative to those of Oceania (average of New Zealand and Australia) in 2001 and 2003. In this database, the UK has the lowest production costs in Western Europe (defined in this data source as EU Member States plus non-EU countries Norway and Switzerland), more or less on a level with those of the USA, but nevertheless about double the cost of production in Oceania.

Figure 8.6 indicates that in 2007, Western Europe still had the average highest milk production costs worldwide (€42.30/100kg). Africa is the region with the lowest average costs of production (about €14/100kg). More important for international trade, however, is Oceania which is a low-cost producer (€16.1/100kg) and a strong net exporter of the bulk products butter and SMP. The Western European average is about 260% that of Oceania, suggesting that the cost gap remains more or less the same as before the 2003 reform.

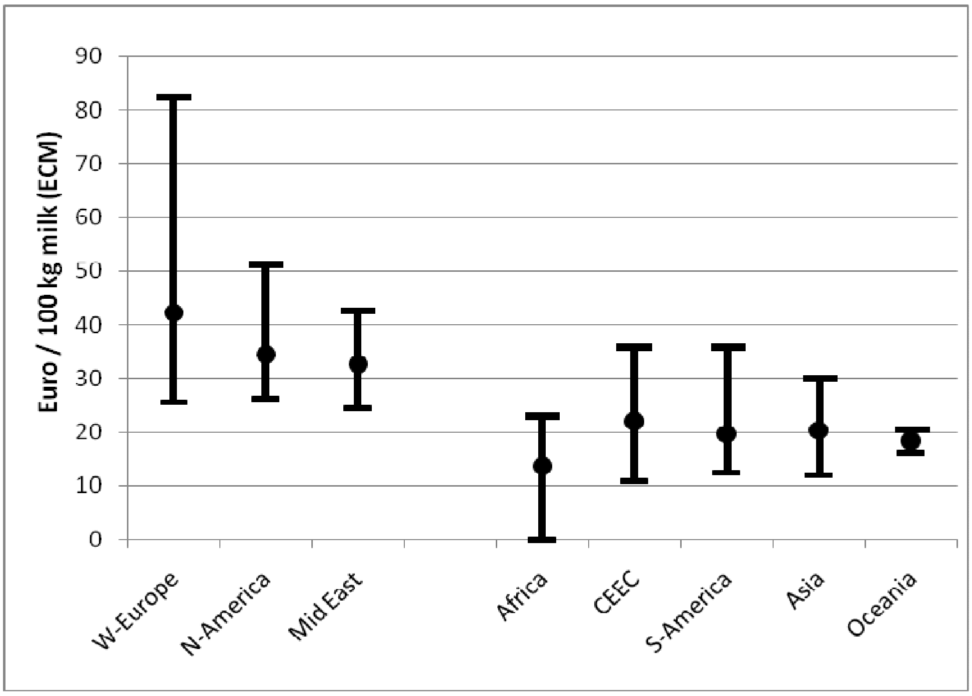
Figure 8.5 Average milk production costs relative to Oceania, 2001 and 2003



Source: own compilation based on IFCN (2002 and 2004).

[70] According to the IFCN terminology, a typical farm is a farm that is 'representative' (not necessarily in a statistical sense) for a group of farms in a certain region.
[71] Note that this information is based on very small samples and as such not comparable to the EU FADN-based cost estimates. For the average specialist dairy farm in EU-27, the EU FADN estimated milk production cost is €32.1/100kg. Since there is no guarantee that the dairy firms in the IFCN network are representative of the population of commercial dairy farms, care is needed in interpreting and generalising the IFCN figures.

Figure 8.6 Costs of milk production inside and outside the EU, 2007, mean values and spread



Source: own compilation based on IDF (2010).

Finally, information given in EQ10 (Table 14.8 and Figure 14.4) shows that from 2004/5 onwards, the TRQ fill rates for butter and SMP were low. This indicates that selling into the EU market became less attractive particularly during 2007-2008, despite the fact that in-quota tariffs remained unchanged at around 40% of the out-of-quota tariff. This indicates that exporting countries could sell these products more profitably elsewhere, and indicates indirectly that the EU internal market had become relatively more competitive. This is not true for cheese, whose TRQs continued to be filled throughout the period 2000/1 to 2008/9.

8.6 Conclusions

Market orientation and competitiveness are both multi-dimensional concepts. Therefore, a number of indicators have been examined in an attempt to track their evolution during the evaluation period.

Market orientation

- Producers' exposure to market signals as transmitted through the payment system when delivering to dairies increased from 2000 onwards, with the exception of the period 2008-2009. This exposure is lower in EU-10 −and especially in EU-02− than in EU-15. It is not possible to relate the increased share of deliveries to particular dairy policy changes or specific instruments. However, it is fully in line with the more market-oriented direction taken by EU dairy policy since the 2003 reform.
- The size of the price gap was smaller in the post-2003 period, thereby indicating some convergence towards world market price levels. Apart from the years 2007-2008, this impact is mainly linked to the 2003 policy changes, notably to lower intervention prices and correspondingly lower export refunds. In the years 2007-2008, the price gap became very small, because the high demand for dairy products that was driving world market dairy prices was transmitted virtually in full to the EU domestic dairy product markets.
- Short-term EU price movements were more strongly linked to world market price volatility during 2007-2008, when there was convergence between the domestic and world market prices of the basic dairy products. In this period, export refunds and intervention became inoperational as domestic price stabilisation instruments, although tariffs still performed their role of restricting

imports onto the EU market. Thus, a relatively high degree of market orientation was achieved during this period, but it was due to external developments rather than EU policy changes.

- During the evaluation period, there was little change in the competition from imported dairy products on the EU market, as tariffs and tariff rate quotas remained nearly constant (see Chapter 14).

Competitiveness

- There was a slight fall in the EU-15 unit costs of milk production after 2003 but the evidence is weak, whereas production costs in the EU-10 increased quite strongly following their accession in 2004. There is no clear link between these findings and changes in dairy policy.
- The share of farms with profitable milk production and the share of milk coming from such farms decreased after 2003. Evidence presented in EQ9, in which the decoupled dairy premium is included in dairy income after decoupling to allow a valid comparison, shows that farm income levels were maintained.
- On average, the EU-15 dairy sector was more viable relative to other agricultural commodity sectors during 2000-2007; after 2003, its relative viability was higher in every year than before 2003, and appeared to be following a rising trend. However, in Austria, Finland and France the dairy sector remained less profitable than other sectors throughout the period. Overall, nonetheless, the policy changes initiated in 2003 have maintained the position of dairying relative to other competing commodity sectors. A rising, more variable trend was also observed in the EU-10 countries after accession.
- Europe (including the EU) is a region with relatively high costs of production. This is in particular relevant when the EU is compared with Oceania (New Zealand), its key competitor in world dairy markets. The incomplete empirical evidence presented does not suggest that the cost differential may be decreasing.

Summary of findings for each indicator, EQ4

Indicator	Expected result	Evidence found
Market orientation		
Producers' exposure to market signals		
Share of total milk delivered to dairies	The upward secular trend was expected to continue.	The expected result was not found. No change in the trend post-2003.
Producers' response to decoupling of payments		
Stated reaction of producers	Producers were expected to perceive decoupling as affording them more freedom in making production choices.	The expected result was not found. Decoupling was considered irrelevant to production decisions.
Willingness to respond to price falls	It was expected that lower prices, together with the decoupling of the premium, could accelerate the rate of herd decline.	Lower prices were cited by active and former producers as a motivation for ceasing milk production. However, trends in herd numbers did not change in response to lower prices after 2003.
Ability to respond to price increases	Easier access to quota was expected to facilitate supply increases when prices increase.	The expected result was found during the high-price period 2007-2008.

Table continues on the next page.

Exposure of markets to world market prices		
Link between domestic & world market price volatility	This link was expected to become stronger with the weakening of the intervention system.	The expected result was found *only* during 2007-2008, when world market prices increased to levels well above EU intervention buying-in prices.
Price support above world market levels	The price gap between EU and world market prices was expected to become narrower (partial convergence).	The expected result was found, partly due to EU policy changes and partly due to increases in world market price levels.
Use of export refunds	The use of export refunds was expected to decline, starting in 2004, due to the shrinking price gap.	The expected result did not occur immediately. High world market prices in 2007-2008 rendered export refunds irrelevant.
Competitiveness		
Production cost		
▪ Cost per tonne of milk ▪ Gross margin over operating costs ▪ Share of farms with positive net profit	The production cost of individual producers was not expected to change due to policy changes. However, average cost for the sector as a whole could decline, if the reforms induced lower-performance herds to quit. If this occurred, then improvements in sectoral profitability would result.	The evidence on sectoral production cost is weak. The share of 'profitable' milk and farms declined immediately after 2003, showing that lower prices did not stimulate a countervailing efficiency improvements among lower-performing producers.
Competitive advantage relative to other sectors, countries		
Profitability relative to other commodity sectors	It was expected that milk would maintain its position relative to other agricultural commodities.	The expected results were found.
International competitiveness		
EU milk production cost relative to main international competitors	International competitiveness was expected to improve providing average cost across the sector became lower.	The evidence found was insufficient to allow a conclusion to be drawn
Competitiveness on the home market – fill rates of TRQs	Lower internal prices were expected to reduce the attractiveness of the EU market for imports.	Evidence found.

9 EQ5: Price stabilisation

To what extent have the CAP measures applicable to the dairy sector contributed to stabilising the market prices for milk products?

9.1 Interpretation and comprehension of the key terms of the EQ5

The key terms in this evaluation question are 'price stability' and 'stabilisation of prices'. Theoretically, price stability means the absence of large, short-term fluctuations around the underlying trend in prices.[72] 'Stabilisation' involves reducing the amplitude and the frequency of these fluctuations until they are within acceptable levels. Whether or not prices in a particular market can be considered 'stabilised' is a matter of judgement, and the degree of stabilisation (or, inversely, the extent of 'acceptable' fluctuations) in one market may be considered inappropriate in another market. At the same time, price movements contain important information for market participants about changes in underlying demand and supply conditions. Removing *all* price movements prevents the transmission of this information. Therefore, it is not desirable to remove all fluctuations or to dampen medium-term price variations that contain useful market signals.

Milk is produced continuously. However, milk supply decisions are usually made on an annual basis. Moreover, at the first link in the supply chain, most milk is sold under contract rather than in the spot market, although contracts typically allow for price adjustments within the contract period. The dairy processing industry can to an extent adjust its product mix more frequently than annually to respond to differential movements in the market prices for individual products, although this is not true of al firms in the industry. These considerations suggest that the desired degree of stabilisation and the amount of price volatility that can be absorbed without economic damage, is not the same for all markets in the supply chain or for all participants.

CAP measures that can play a role in stabilising market prices have two characteristics: a) they influence the level of market price (b) they can be adjusted on a relatively short-term basis in order to counteract short-run price movements. This rules out measures whose impacts on market price are small or unpredictable, those that are more or less fixed in a longer-term perspective, and those whose effects are lagged or distributed over time. The CAP measures that have the most potential for stabilising market prices of dairy products are export refunds, the buying-in rate of intervention for butter and skim milk powder, and to a much lesser extent certain disposal aids for intermediate and final consumption of dairy products.[73] Most of the latter were abolished in 2009.

Earlier chapters have already referred to the exceptional market conditions that occurred during the period 2007-2009. In addition to the usual volatility of world market prices for dairy products, the commodity boom of 2007-2008 produced an exceptionally high spike in their prices on the world market, which was followed by a sharp fall –beginning at the end of 2008, reaching its lowest point (at levels comparable with prices earlier in the decade), and then rising again, in some cases quite sharply, towards the end of 2009. The analysis in this chapter will investigate the impacts of these external price developments on internal EU prices, and assess the role played by CAP dairy measures in stabilising their impact.

[72] The 'trend-value' is the underlying smooth evolution of price around which actual price fluctuates. When a price temporarily undershoots or overshoots its trend value, it sends a misleading signal to market participants.
[73] Although intervention thresholds, ceilings and rates are set out in the legislation, the Commission has discretion to vary them according to developments in the market. Ceilings ('bindings') for subsidised dairy exports and for expenditure on dairy export subsidies are laid down in the WTO schedules of the Uruguay round agreement on agriculture. Here too, however, within these limits management committees have discretion to vary the amounts and timing of export subsidies.

The official intervention buying-in periods for these products (carried over from earlier legislation by the legislation in force, Regulation (EC) 1234/2007) are fixed as 1 March to 31 August. During this period, public intervention is opened when market price falls below the corresponding effective intervention buying-in price. Once the volume ceilings indicated in the legislation are reached, intervention at fixed, guaranteed prices may be suspended and may be replaced by a tendering system. At other times of the year, public intervention is officially closed for dairy products. This system has performed well in the past in its intended role of smoothing internally generated, seasonal price fluctuations.

As already documented in Chapter 6 (answering EQ2), during 2009 the Commission supplemented the intervention system with a set of special additional measures, including an extension of the period for, and maximum duration of, private storage aid for butter, an extension of the intervention period beyond the normal 31 August closing date, and buying-in under tender (at prices close to the fixed buying-in price) of significant quantities in excess of the fixed-price ceiling. As a result of adopting these measures, an extra 13 thousand tonnes of butter were taken into private storage during the extended time period for this measure. By contrast, despite the extension of the open intervention period, intervention buying-in of butter and SMP effectively stopped in early September and early October, respectively. This does not, however, exclude that the extended availability of intervention sent a signal to the processing industry that the safety net for these products would continue to be effective. Moreover, during the preceding regular intervention period, an additional 53.222 thousand tonnes of butter beyond the 30-thousand-tonne fixed-price ceiling were bought into intervention under tender, as was an additional 178.587 thousand tonnes of SMP beyond the 109-thousand-tonne fixed-price ceiling for SMP intervention buying. The total quantities of butter and SMP bought into intervention during 2009 represent 4.5% and 27.4%, respectively, of their 2009 production. Our examination of EU price movements will indicate whether these additional measures were sufficient and well timed.

The products involved in this evaluation question are butter, SMP, WMP, cheese, drinking milk and cream. Export refunds can in theory be used for all these products (the categories for which WTO export ceilings exist are butter, SMP, cheese and other dairy products (see Table 2.48)). Intervention buying and selling applies only to butter and SMP. The extent to which stabilisation of the price in the market for one product helps to stabilise prices in other markets, or merely displaces price volatility from one market to another through the workings of substitution effects between products (on either the supply or demand side), is beyond the scope of the analysis here. However, these inter-market effects undoubtedly exist and need to be borne in mind when looking at the data.

9.2 Methodology used for answering EQ5

The effects of the CAP measures on price stability are analysed by comparing the levels and trends in EU prices with those of world market prices, and by comparing volatility between domestic and world markets and between the pre-2003 and post-2003 periods.

Volatility is measured by the annualised standard deviation (ASD). As explained in the methodology section of EQ 2, it is the standard deviation of the logarithm of price multiplied by the square root of the number of observation periods per year (here 12, because we use monthly data). It is calculated as:

$$ASD(p_1,\ldots,p_n) = SD(p_1,\ldots,p_n) \times \sqrt{12} \qquad (1)$$

where $p_1,\ldots,p_n$ is a price series in logarithmic form, extending over *n* periods.

Converting prices to logarithmic form allows price variability to be captured as a percentage of the (geometric) mean and in this way it resolves the problem of non-comparability between the standard deviations of different prices either because they have means or trends of different sizes, or because they are expressed in different currencies. The other volatility indicators presented in EQ2 are not reported in this evaluation question, as they lead to the same general conclusions.

9.3 Judgement criteria, indicators and information sources used for each indicator

Table 9.1 lists the indicators used to address this evaluation question, their data requirements and the sources of these data. Both indicators shown in Table 9.1 are calculated for a representative monthly EU producer price and the monthly world market price of butter, SMP, WMP and cheddar cheese (a cheese that is heavily traded in world markets). The representative EU prices used for the first three products are the Dutch producer prices of each commodity, and for cheddar cheese the German price. These series were chosen in order to ensure sufficiently long time-series data of consistent and homogeneous quality. The extent to which they are 'representative' of EU dairy product prices was carefully checked. The work of O'Connor (2006), based on sophisticated statistical techniques, confirmed a high degree of integration across the EU in dairy product markets; not only is the EU market for homogeneous products very well integrated, functioning like a single market, but price movements are highly correlated between Member States. For later years (1999 to 2010), we also compared the levels and movements of the Dutch product prices used in this study with the Commission's series of weighted average prices at EU level (DG AGRI, unpublished). The series were found to be very close.[74] These findings contrast somewhat with the evidence on milk raw prices reported in Chapter 6, where a high degree of heterogeneity between Member States was observed, with the Netherlands being one of the Member States with the highest volatility, especially in the second part of the evaluation period (see Table 6.2 and Figure 6.5). However, it must be borne in mind that the wholesale product prices analysed in this chapter are observed at the next link downstream in the supply chain, and for various reasons do not necessarily exhibit the same characteristics as do prices of particular dairy products. The monthly world market prices (Productschap Zuivel, various years) refer to the respective Oceania FOB prices. The indicators span the period 1997–2010. The indicators for cream and drinking milk are not calculated because reliable data were not available.

Table 9.1 Indicators, data requirements and information sources for EQ5

Indicator	Data requirement	Information sources
Comparison of movements in EU market prices and world market prices for individual dairy products	Representative producer prices (monthly data) World market prices (monthly data)	Agra Europe (2010a and b) Productschap Zuivel (various years)
Comparison of measured price volatility for the period before and after 2003 measured by the annualised standard deviation for butter, SMP, WMP and cheese	Same series as above	Idem

The following judgment criteria are used:

- The level and the trend of the EU producer prices for the above mentioned commodities is examined for the periods before and after 2003. It is expected to find a decline in the EU prices in particular for butter and SMP after 2004 because of the gradual reduction in the intervention prices. If this is found, it would indicate the expected impact of policy changes on prices.
- The annualised standard deviation is used to reach a conclusion whether a) price volatility in the EU increased in the period after 2003 relative to preceding period and whether b) the degree of stability of the EU prices relative to the world market prices decreased after the policy changes that are evaluated in this report. It is expected that stability will be lower because since 2003 market intervention decisions implied less vigorous use of export subsidies and the scaling down of intervention storage and disposal aids.

[74] For example, for the weighted average series, the means for butter and SMP are €293.6/100kg and €221.3/100kg, respectively, with coefficients of variation 18% and 13%. The comparable figures for the corresponding Dutch prices are €293.1/100kg and €218.7/100kg, with coefficients of variation of 19% and 13%, respectively.

9.4 Results and analysis

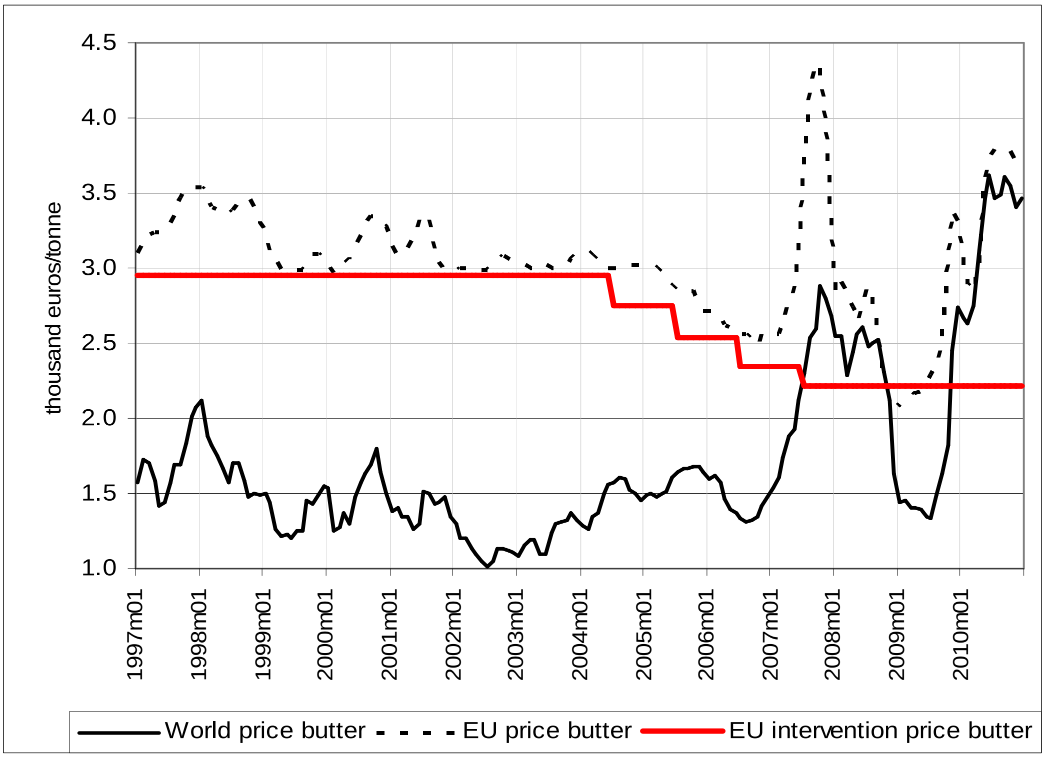
9.4.1 Butter

Figure 9.1 shows the evolution of butter prices in the EU and in the world markets. The *effective* intervention price (90% of the reference price) played a role in the evolution of the EU producer prices. Until mid-2002 it acted as a floor price limiting the decrease of the EU butter price and maintaining a rather stable gap between the EU and the world market prices. The gradual reduction of the intervention price, which started in 2004 as agreed in the 2003 policy reform package, meant that the EU butter price could fall lower than previously. Hence, after 2004 the gap between the world market price and the EU price narrowed.

The period 2007-2009 was marked by imbalances worldwide and by sharp fluctuations in prices. For some months during this period, the world market price for butter was higher than the effective intervention price. During this period, export refunds and intervention buying were not relevant, Therefore, EU dairy policy offered virtually no effective internal stabilisation instrument. Hence, the EU butter price moved in parallel to the world market price. The same situation recurred in 2010.

For some months from late 2008 onwards, the EU price for butter was significantly below the effective intervention price. This occurred during months when public intervention for butter is not open (see Regulation (EC) 1234/2007) and so the intervention system did not act as a safety net.

Figure 9.1 Evolution of EU and world butter prices, 1997-2010



Notes: The world market price is the Oceania fob export price for butter (82% butterfat); the EU effective intervention price is 90% of the reference price; the EU butter price is a representative price and is based on the Dutch producer prices for butter.

Sources: Agra Europe (2010a and b); Regulations (EC) 1787/2003 and 1234/2007; Productschap Zuivel (various years).

Figure 9.1 shows that the EU representative butter price used was below the effective intervention price for several months at the end of 2008 and for most of the first part of 2009, although intervention buying-in of butter began in March 2009. In order to verify this finding, the monthly butter price at Member State level was checked for those Member States whose data are available in the DG AGRI (AgriView) data base. The findings are presented in Table 9.2.

Table 9.2 Average producer price for butter, selected Member States, 2009, €/100kg

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Belgium	221.82	220.53	221.48	223.58	225.58	232.06	234.74	247.45	274.13	315.06	339.20	323.68
Denmark	293.09	270.69	272.46	271.33	268.56	268.64	270.73	280.20	304.86	308.20	306.90	307.06
Germany	224.80	221.42	213.08	218.78	220.55	217.37	218.46	232.91	241.31	248.08	266.92	289.53
Spain	207.44	198.99	199.75	196.63	200.57	203.75	203.17	205.30	211.33	230.14	256.88	300.72
France	215.00	215.00	215.00	215.00	215.00	219.20	223.50	227.70	245.30	279.40	311.20	312.00
Ireland	203.44	210.89	216.01	215.41	214.89	218.98	220.57	224.01	224.17	234.63	265.52	275.48
Italy		220.00	216.25	215.00			221.33	223.60	249.00	282.40	298.00	300.00
Netherlands	206.25	210.33	214.50	216.50	218.00	226.00	227.75	235.40	251.20	301.00	338.00	329.00
Portugal	206.02	201.88	201.98	202.12	205.94	215.05	213.80	219.31	226.04	252.54	297.19	323.65
UK	195.66	208.44	201.95	205.53	215.27	226.64	229.53		219.95	249.61	261.07	306.30
Czech Republic	211.98	205.26	215.64	227.29	217.54	216.89	221.50	250.08	251.56	270.51	291.26	292.12
Hungary	300.95	406.67	422.10	408.63	385.33	453.10	445.92	459.93	431.37	443.69	450.34	447.17
Latvia	236.99	253.49	236.50	261.57	277.41	227.32	221.67	214.51	227.78	244.68	303.51	308.55
Poland	209.17	195.54	200.51	209.44	207.06	211.24	228.54	240.05	248.19	300.71	337.72	324.32
Slovakia	271.00	303.25	272.02	268.07	276.84	313.27	278.88	289.49	322.58	332.69	364.27	384.27

Note: Grey cells indicate prices below the intervention price level. For MS not mentioned, data are missing

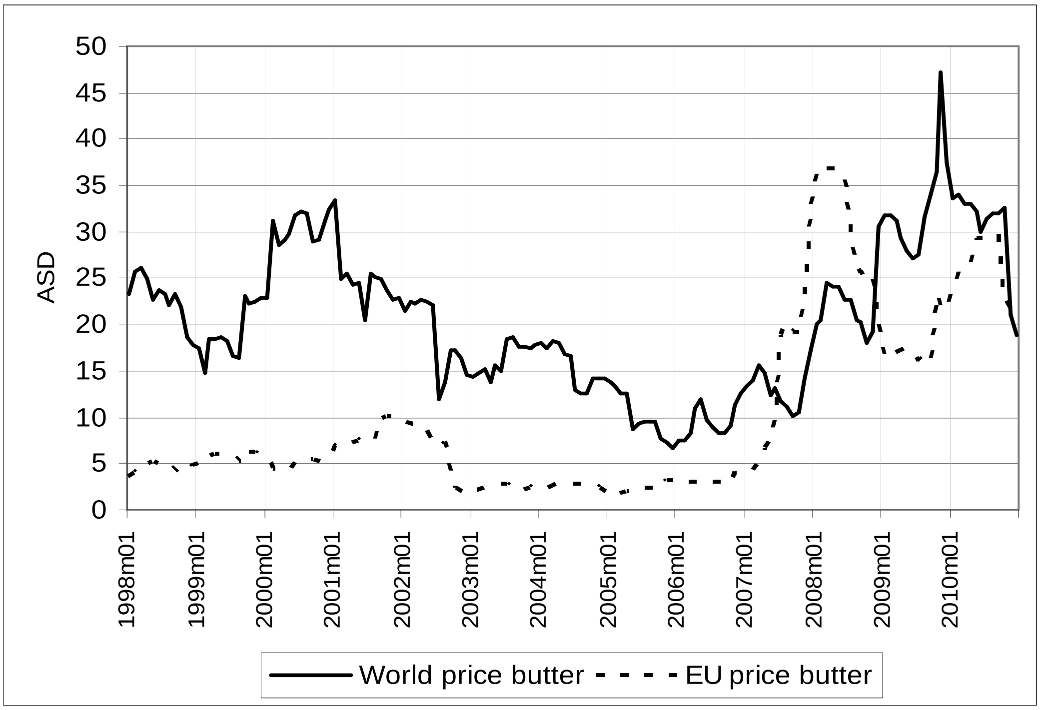
Source: DG AGRI (AgriView)

Table 9.2 shows that 12 of the 15 Member States reported had butter prices below the intervention buying-in price of €222/100kg for more than one consecutive month, and that for ten of them this situation persisted (or occurred for the first time, as in Latvia) beyond June 2009.

Figure 9.2 shows the annualised standard deviation for the EU and world market butter prices shown in levels in Figure 9.1. The reader should note that the volatility calculated for month m is based on data from month m-12 to month m-1, i.e. it refers to price movements over the previous 12 months.

Between 1997 and 2003, CAP policies had a stabilising impact on EU butter price: the volatility of the EU price was much lower than that of the world market price. This effect continued for the period 2004-2006, even though the volatility of the world market prices itself was much lower. The situation changed after 2006 but here one should distinguish two phases, depending on whether the world price was lower or higher than the effective intervention price. In the first case (which was the case up to mid-2007 and for nearly all 2009), the volatility of the EU butter price was lower than that of the world market price, due to the activation of the CAP's price stabilisation instruments. However, when the levels of the world market price for butter and SMP rose above the effective EU intervention price, then the protection against volatility ceased, as intervention and export refunds could not play their normal role and were suspended. This occurred for part of 2007 and most of 2008. During 2008, and particularly 2009, the volatility in the EU was high, and higher than that of the world prices. Export refunds and intervention stocks were re-activated in the course of 2009, and volatility was reduced.

Figure 9.2 Annualised standard deviation (ASD) for butter prices



Notes: The volatility in month m is calculated with data from month m-12 to month m-1.
Source: own calculations.

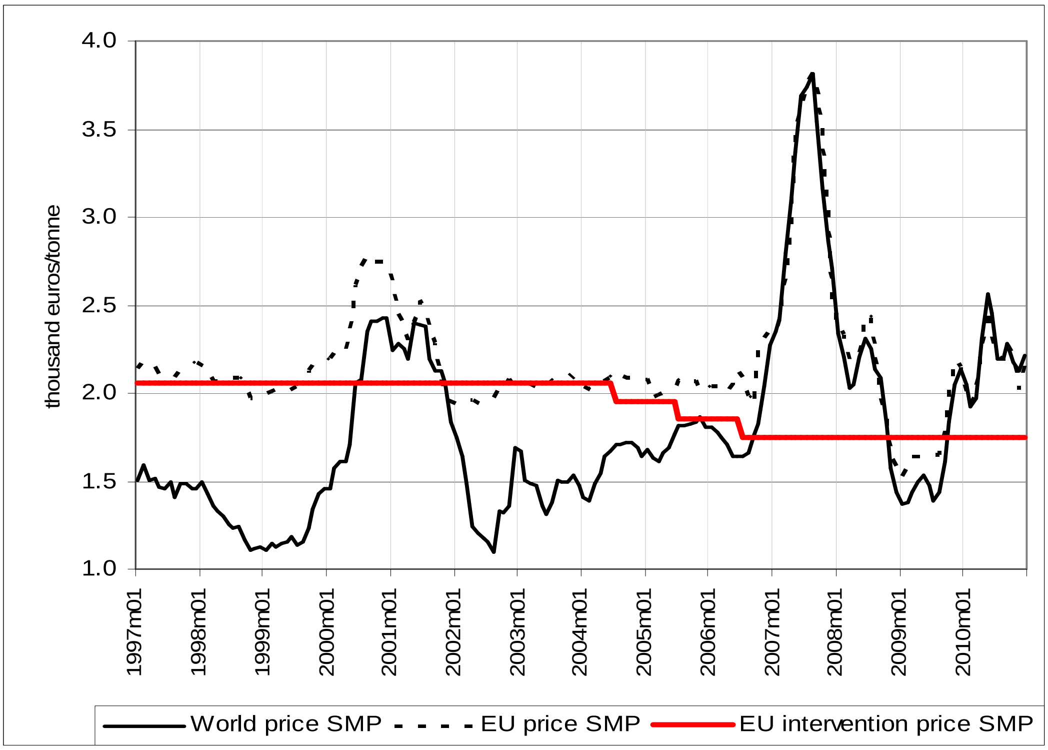
In summary, as long as the world market price was lower than the effective intervention price for butter, then EU policies had a positive impact on price stability. However, lowering the effective intervention price for butter after 2003 made it more likely that the world price could exceed the effective intervention price. When this happened, from mid-2008 onwards, the volatility in the EU internal butter price was similar to that of the world market price. Clearly, when the world market price lies above the intervention buying-in price, then export refunds are irrelevant and lose their ability to reduce domestic price fluctuations. In an episode like that of 2007-2008 when the usual stabilisation instruments are inoperational, it is theoretically possible to use changes in domestic consumption aids to counteract internal price movements, but in practice this would be difficult as these instruments were not designed to counter short-term price movements and using them for this purpose could well have had a destabilising effect on use of butter as an intermediate input in food processing. Most disposal aids were discontinued in 2009.

9.4.2 SMP

Figure 9.3 shows the evolution of the EU producer price and world market price for SMP. As in the case of butter, up to 2004 the intervention price for SMP was effective in keeping the EU producer price for SMP above the world market price, except for several months at the end of 2001 when the two prices coincided. After 2004, the role of the intervention price for SMP decreased both because of the gradual decrease of the SMP intervention price and because of the increase of the world market price. Starting in mid-2006, the world market SMP price was higher than the intervention price until the last months of 2008, whereas from late 2008 until late 2009, the EU producer price was below the intervention price by more than at any other tie in the period covered in Figure 9.3. As was noted for butter, when the world market price was higher than the intervention price, then the movements in the EU price are strongly correlated with those of the world market price. The traditional stabilisation measures (export refunds and intervention buying) are not operational in these conditions.

From late 2008 until late 2009, the EU price for SMP was well below the intervention price, despite the fact that some of the months concerned coincided with the official 'open' buying-in period. Here too, as was observed for butter, the intervention system did not provide an effective safety net.

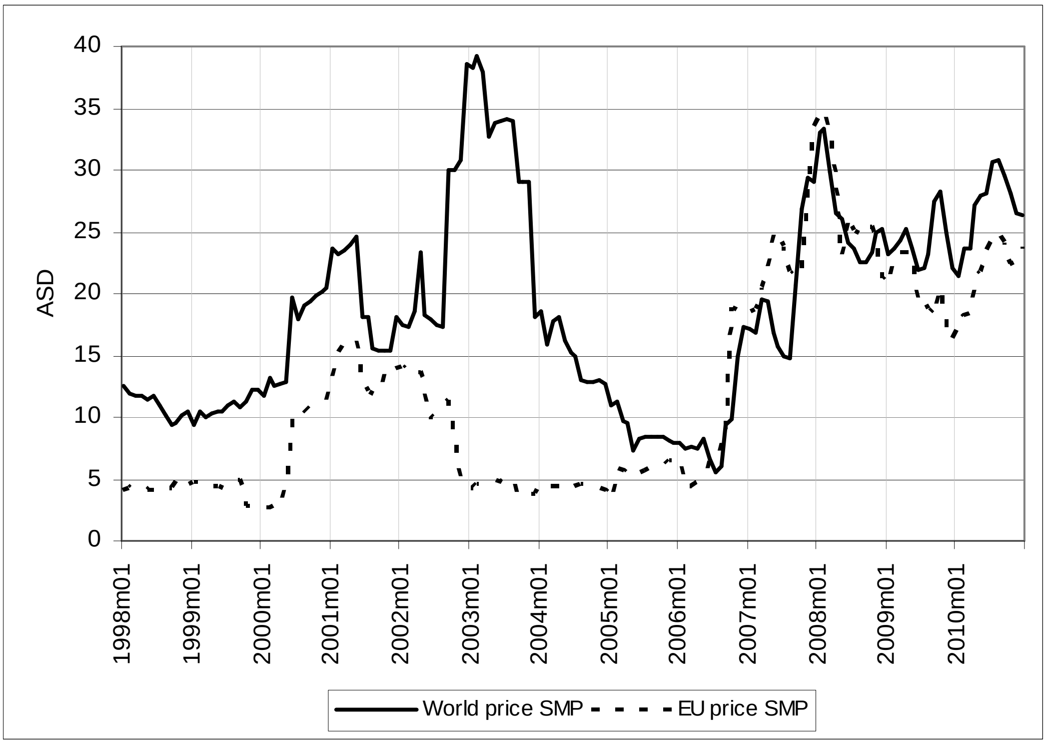
Figure 9.3 Evolution of EU and world SMP prices, 1997-2010



Notes: The world market price refers to Oceania FOB export price for non-fat dry milk (1.25% butterfat); the EU SMP price is a representative price and is based on the Dutch producer prices for SMP. The EU intervention price for SMP is the reference price.

Source: Agra Europe (2010a and b); Regulations (EC) 1787/2003, 1234/2007 and 361/2008; Productschap Zuivel (various years).

Figure 9.4 Annualised standard deviation for SMP prices



Notes: The volatility shown for month m is calculated with data from month m-12 to month m-1

Source: own calculations.

Figure 9.4 presents the annualised standard deviation of the EU producer price and the world market price for SMP. The combined use of intervention and export refunds had a stabilising effect until 2004, maintaining the volatility of the EU SMP price well below that of the world market price. This role continued until mid-2006, even though the world price was rising and the price gap shrinking. However, in the second half of 2006, the world market price rose above the SMP intervention price. Thereafter, the volatility of the EU SMP producer price increased and was almost as high as that of the world market price. This persisted as long as the world market price exceeded the intervention price. In 2009, the EU market price for SMP was below the intervention price for some months because intervention was suspended. Export refunds were re-activated during 2009 bringing volatility down a little, but it remained well above the pre-2007 level.

Figure 9.3 shows that the 'representative' producer price for SMP remained below the intervention buying-in price for many months, beginning at the end of 2008 and continuing until the end of the summer 2009. Again, in order to check that this is a representative finding, the SMP producer prices at Member State level from DG AGRI (AgriView) were examined. Table 9.3 presents the monthly results for those Member States whose data are reported.

Table 9.3 Average producer price for SMP, selected Member States,2009, €/100kg,

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Belgium	174.94	171.90	167.74	168.04	170.04	171.06	171.50	173.90	188.45	206.42	217.16	211.45
Denmark	186.05	183.42	174.59	178.30	187.99	179.32	183.57	180.68	185.66	189.07	206.14	209.24
Germany	161.50	165.00	166.50	167.50	167.50	167.50	167.50	171.50	182.50	197.00	211.70	210.00
France	172.00	168.25	164.70	165.50	166.50	166.80	167.00	168.80	180.10	201.00	219.40	213.40
Netherlands	151.25	160.33	164.00	164.25	165.00	165.00	165.00	166.40	179.00	197.00	218.00	213.75
UK	171.22	163.91	163.36	168.31	172.89	179.81	175.41	177.39	167.75	177.18	190.18	195.89
Czech Republic	157.73	152.34	156.54	154.15	158.53	162.86	168.62	162.51	166.15	169.10	174.44	192.71
Hungary	193.96	183.65	326.57	334.04	443.89	459.98	443.09					
Latvia	321.01	277.79	293.50	276.25	206.09	236.33	190.78	192.26	198.55	165.41	181.70	229.09
Poland	142.58	139.54	146.77	155.34	155.70	154.40	161.85	165.82	164.09	171.85	189.40	192.52
Slovakia	279.24	237.83	247.55	175.94	176.43	213.98	181.20	181.04	185.78	180.44	219.68	254.06

Note: Grey cells indicate prices below the intervention price level. For MS not mentioned, data are missing
Source: DG AGRI (AgriView)

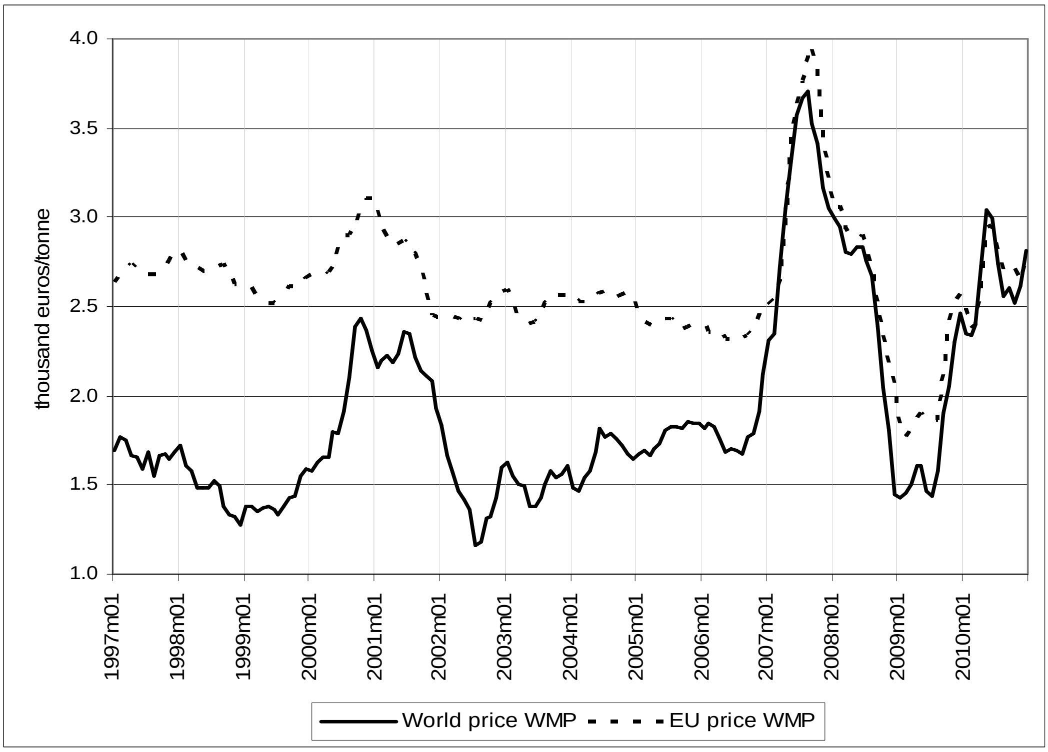
Table 9.3 indicates that a number of Member States had producer prices well below the intervention buying-in price of €175/100kg for a number of months in 2009. The evidence in Tables 9.2 and 9.3 indicates that despite the additional measures adopted during 2009 to strengthen the safety-net role of the intervention system, it was not able to keep prices above the minimum level. Moreover, unlike the evidence for butter (where the situation in a number of Member States began slowly to improve once intervention buying began) the low prices for SMP were more persistent and in six of the countries shown it persisted until August (or beyond).

9.4.3 WMP

The EU market price of WMP is strongly related to the prices of SMP and butter. While there is no intervention price for WMP, the intervention prices for butter and SMP indirectly affect the formation of the EU WMP producer price.

Considering the relationship between the EU producer price and the world market price for WMP shown in Figure 9.5, two periods can be distinguished. The first extends up to the first quarter of 2007, during which the EU price was above the world market price, and the second period is from then on. In the first period, there is a considerable price gap. Some of the fluctuations in the world market price are transmitted to the EU price but with a smaller amplitude. In the second period, the EU and the world market prices are almost the same, except that in 2009 the EU price did not drop as low as the world market price. Thus, export refunds, which were the only CAP instrument available directly for stabilising WMP prices, played a role in keeping the EU prices above the world market up to 2007. WMP prices probably also benefited indirectly form the stabilising effect of intervention on butter and SMP prices.

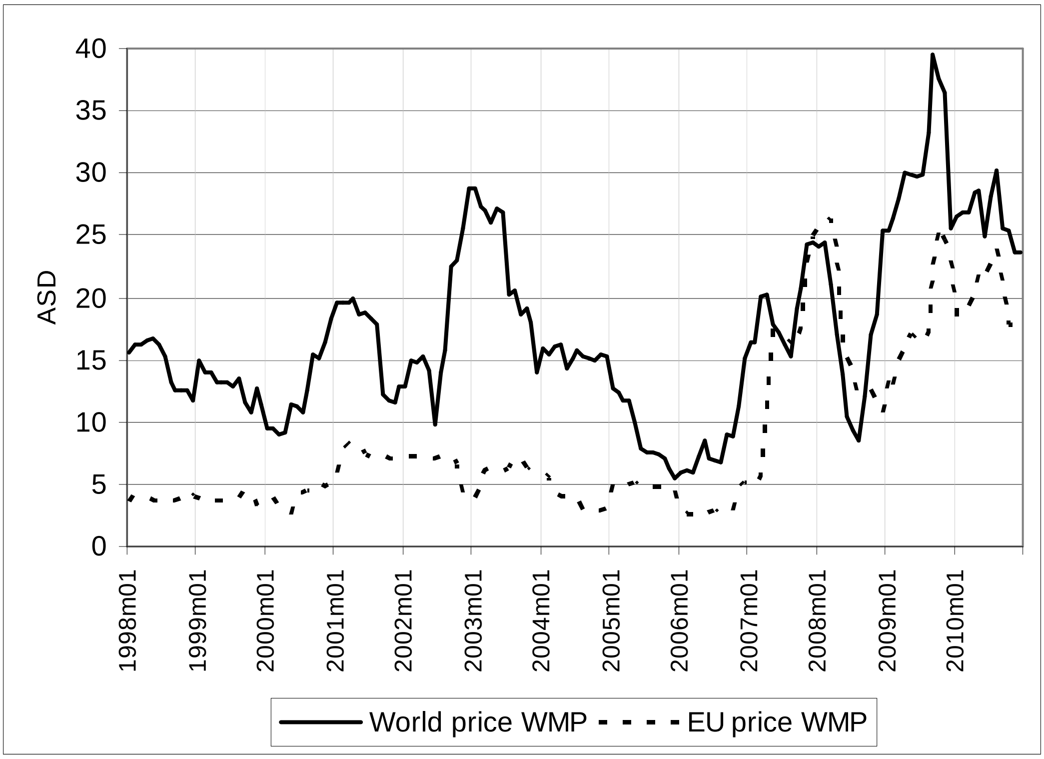
Figure 9.5 Evolution of EU and world WMP prices, 1997-2010



Notes: The world market price refers to Oceania FOB export price for WMP (26% butterfat); the EU WMP price is a representative price and is based on the Dutch producer prices for WMP.

Source: Agra Europe (2010a and b); ProductschapZuivel (various years).

Figure 9.6 Annualised standard deviation for WMP prices



Notes: The volatility shown for month m is calculated with data from month m-12 to month m-1.

Source: own calculations.

The annualised standard deviation for WMP prices (Figure 9.6) shows that until late 2006 the EU producer price for WMP was less volatile that the world market price. During 2006, the volatility of the EU price increased and reached the volatility level of the world market prices. This confirms the conclusion drawn on the basis of Figure 9.5. Although world market turbulence was greater in these last years, an important factor is that the additional volatility of EU butter and SMP prices, due to the world price being higher than the intervention price for these products, is transmitted via their substitutability in production to the WMP price. Thus, indirectly the lowering of the intervention prices for the two intervention products has also affected WMP price volatility.

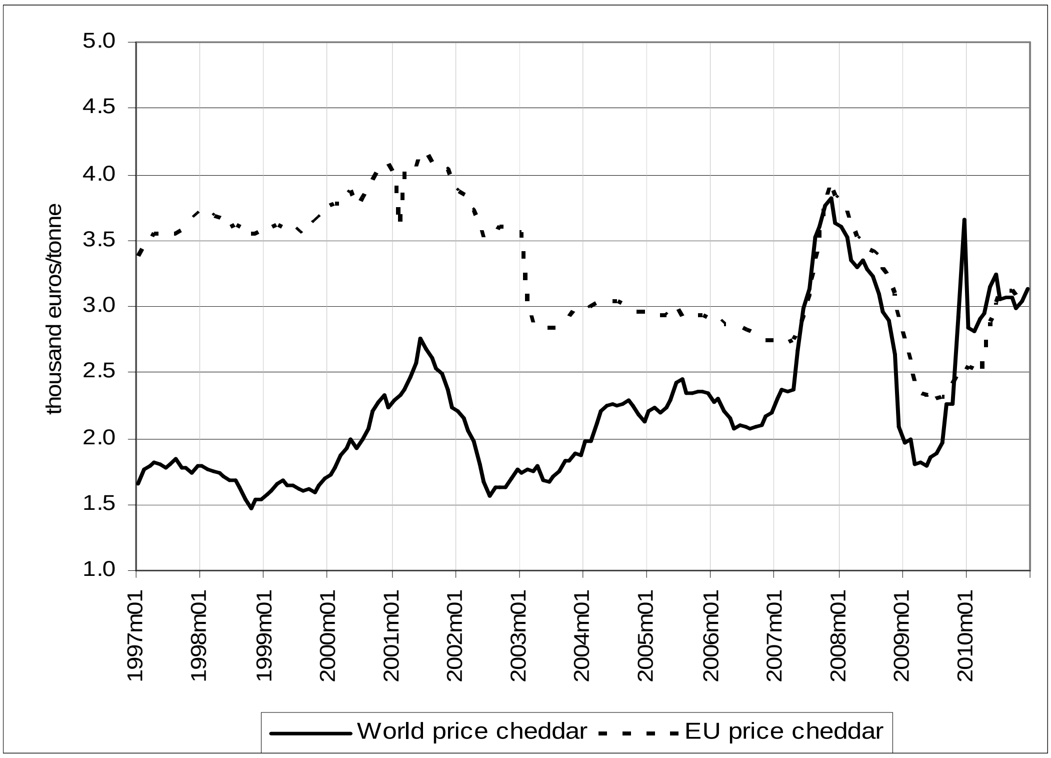
9.4.4 Cheese

The EU cheese market is more heterogeneous than the markets for the commodities discussed so far. We begin by analysing the volatility in the price of one widely consumed and traded cheese, cheddar cheese, which is produced in a number of Member States. Figure 9.7 presents the average EU producer price and the world market prices for cheddar, while Figure 9.8 shows the annualised standard deviation for those two prices.

The EU cheddar price was higher than world market price until 2007. It had reached a peak in 2001, after which it fell gradually. At the start of 2003 there was a sudden drop of about €500/t, after which it remained at a steady level with a price gap that was never less than €500/t. After 2007, the world market price for cheddar surged upwards, pushing the EU producer price for cheddar up almost to its former 2001 peak.

The volatility of the EU price was for most of the period lower than that of the world market price, both before and after the EU policy changes, with two exceptions - in 2000 and in 2001 (see Figure 9.8). Although after 2007 the volatility of the EU price increased, it remained below that of the world market price. The EU cheddar price was less volatile than other EU dairy product prices during the period of price turbulence (2007-2008). This is partly because the CAP export refunds played a stabilising role. Another factor is the structure of the European cheese market, which is characterised by many close substitutes.

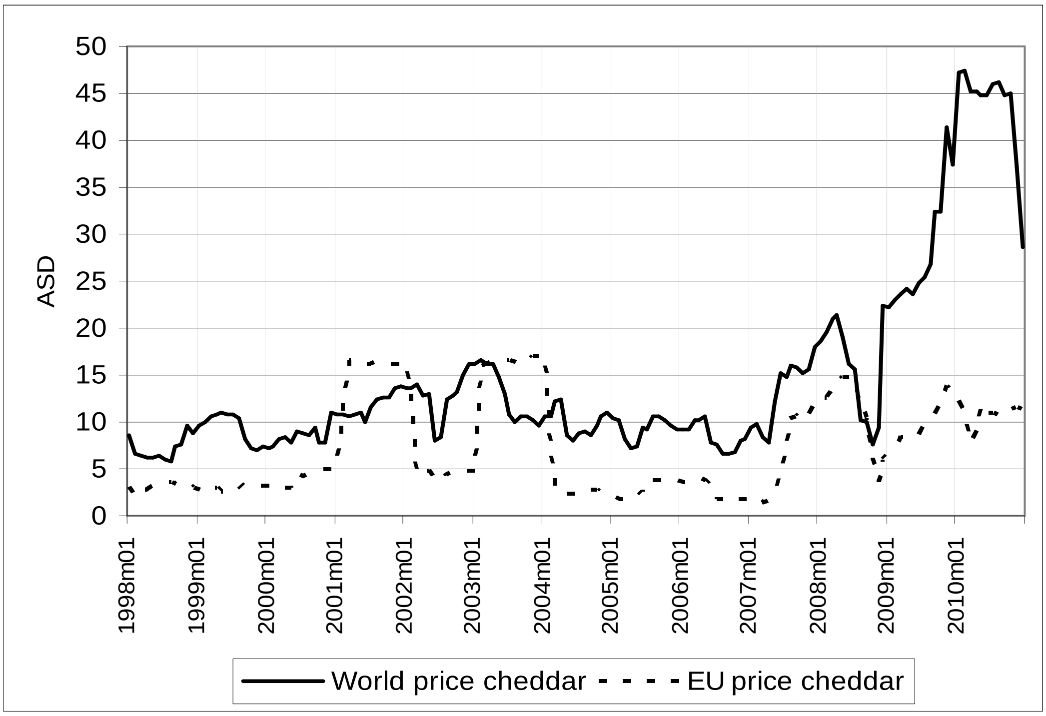
Figure 9.7 Evolution of EU and world cheddar prices, 1997-2010



Notes: The world market price refers to Oceania FOB cheddar cheese price, 39% moisture; the EU cheddar price is a representative price and is based on the German producer prices for cheddar cheese.

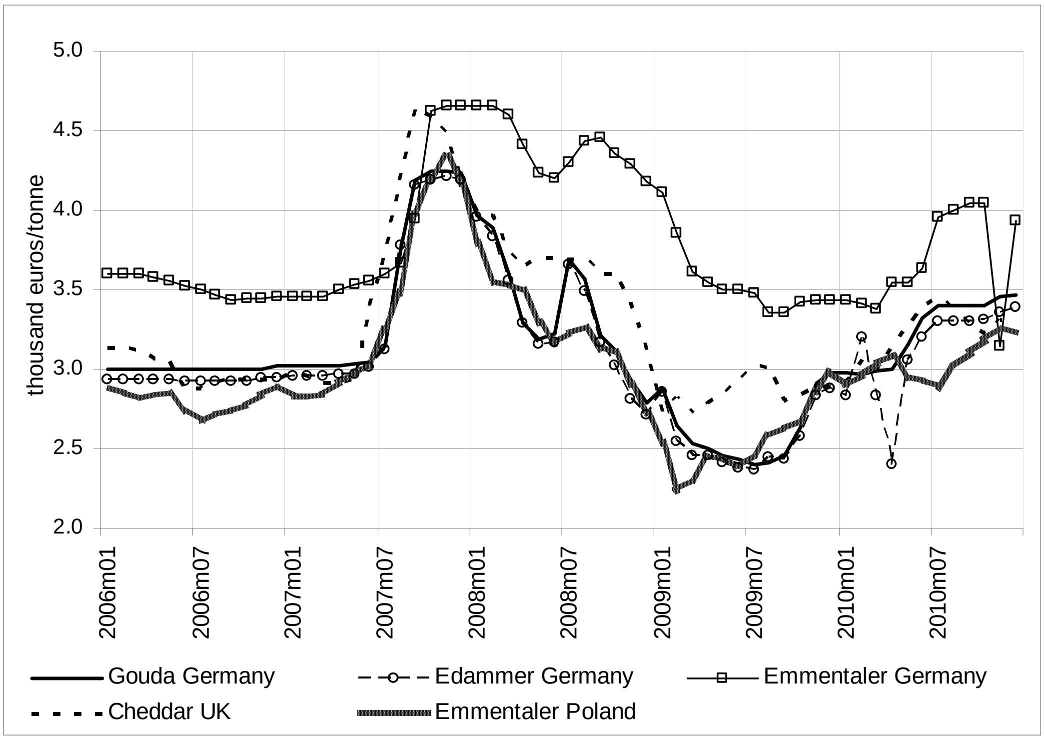
Source: Agra Europe (2010a and b), ProductschapZuivel (various years).

Figure 9.8 Annualised standard deviation for cheddar cheese prices



Notes: The volatility in month m is calculated with data from month m-12 to month m-1.
Source: own calculations.

Figure 9.9 Monthly producer prices for Gouda, Emmentaler, Edammer and Cheddar cheese, 2006-2010

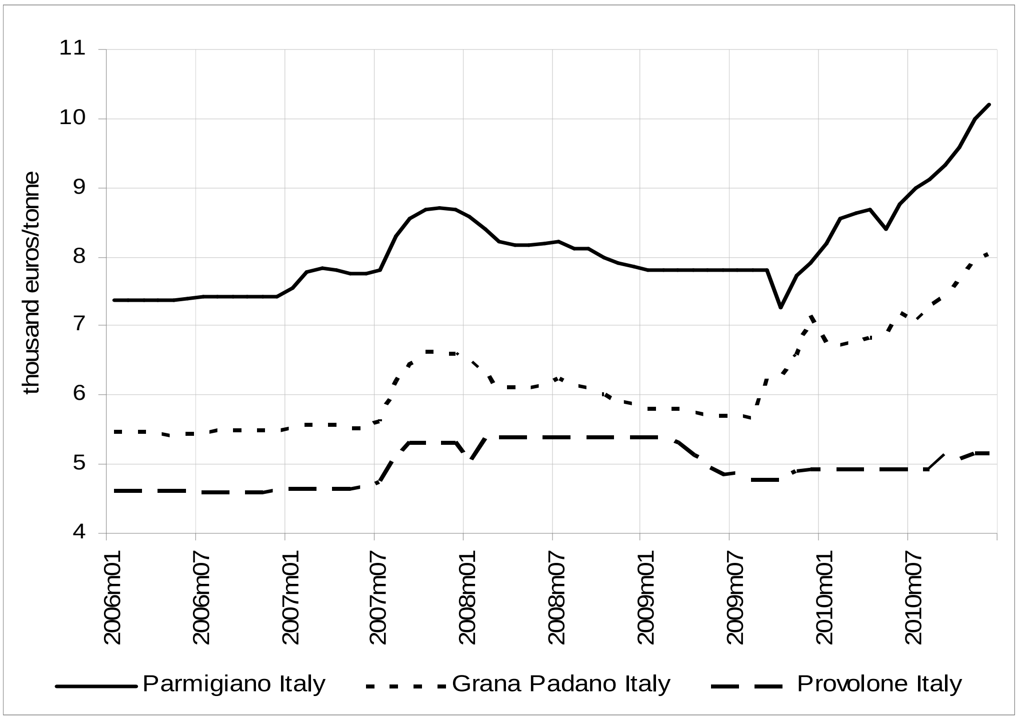


Source: Productschap Zuivel (various years).

As the relative prices of different cheeses change and one price starts to get out of alignment with others, shifts in demand between cheeses play a stabilising role. Cheddar is widely traded on international markets. However, the EU has a large number of other substitutable cheeses that are not traded to nearly the same extent, if at all, and whose prices can absorb some of the shock of price volatility for the more heavily traded cheeses, which in turn moderates the volatility in these traded cheeses.

Figures 9.9 and 9.10 give some examples of the price fluctuations for other more 'domestic' cheeses during the second part of the 2000s. Prices of PDO cheeses, such as Parmigiano Reggiano, Grana Padano, or Provolone hardly fluctuated between 2006 and 2010 (Figure 9.10) and were not influenced either by the world market imbalances or by the CAP price stabilising instruments.

Figure 9.10 Producer prices for PDO cheeses, 2006-2010



Source: Productschap Zuivel (various years).

9.4.5 Drinking milk and cream

The survey of dairy processors conducted for this evaluation confirmed that prices for drinking milk are negotiated between the dairies and the retailers, and hence are considered by both parties to be sensitive information, which for strategic reasons cannot be reported in any statistical report. Indeed, EU prices for this link of the supply chain cannot be found anywhere in the public domain and only consumer prices are ever reported (ILO, various years). Although the dairy companies participating in the survey refused to give any data on drinking milk prices, they clearly stated that the level of the prices depends mainly on the retailers' market power. Therefore, CAP price stabilisation measures (intervention and exports refunds for other products) and the changes in these measures since 2003 are not expected to affect the prices of drinking milk directly. Any effects that might be detected will have been indirect only, and simply because drinking milk competes with other dairy products for its raw material.

For cream, data are scarce and unreliable. This made it impossible to calculate any indicators. Our survey respondents confirmed the existence of a link between the cream and the butter prices, implying that the effects of the CAP reform go in same direction as for butter prices. One can assume that there are also parallels between the volatility of cream prices and butter prices.

9.5 Conclusions

EU prices for dairy products were substantially above world market prices prior to 2003, and this situation continued after the 2003 reform until late 2006-early 2007. The price gap was eliminated for nearly two years thereafter, because of exceptionally high world market prices. The CAP policy changes were not a direct casual factor in these changed market conditions, which were generated by events on world markets.

EU dairy product prices became more volatile in the second part of the post-2003 period. Volatility began to increase sharply during 2006 for butter and WMP (some months earlier for SMP and about a year later, and much less markedly, for cheese) when world market price levels rose to very high levels, considerably above EU intervention prices. From here on, export refunds and intervention became inoperational as stabilisation instruments for butter and SMP. This phenomenon was caused by unstable demand movements on world market. CAP policy changes were not direct causal factors, although lower internal prices and a scaled-down intervention system increased the probability that such an episode could occur.

During this episode of high world market prices, world market price volatility was transmitted without impediment to EU prices for butter, SMP and WMP. The situation for cheese is somewhat different. The EU produces a wide variety of cheeses, some of which −like Cheddar cheese− are heavily traded on world markets whilst others are mainly consumed internally. Shifts in consumer demand between cheeses on the EU market helped to smooth the volatility coming from the world market in the domestic prices of the traded cheeses.

Clearly, the EU policy reform was not the cause of the increased volatility, which originated in the over-heating of world commodity markets and the price spikes for many agricultural commodities, including dairy products, on world markets. However, the episode has revealed three important properties of the reformed CAP, namely that (a) when intervention prices are set at low 'safety-net' levels, there is a greater probability of world market price exceeding intervention price and such a situation developing, (b) when this happens, the CAP has no effective price stabilisation instrument to dampen upward price surges and (c) when prices fall suddenly and steeply, as may easily happen after a price spike, even if world market prices fall below intervention levels, the safety net may be slow to react (if this occurs outside the regular intervention period and additional legislation is needed) and even when extra measures are in place, it may be insufficient. Expectations play a role here: if processors are uncertain that the safety net will be activated quickly enough or so as to receive a sufficient volume of intervention products in the short run to deal with emergency conditions of this kind, they will be cautious about the prices they offer for raw milk.

For both butter and SMP, the average internal price was below the intervention price for some months, starting in late 2008 and extending into 2009. The official intervention buying-in periods for these products (carried over from earlier legislation by the legislation in force, Regulation (EC) 1234/2007) are fixed as 1 March to 31 August. During this period, public intervention is opened when market price falls below the corresponding effective intervention buying-in price. Once the volume ceilings indicated in the legislation are reached, intervention at fixed, guaranteed prices may be suspended and may be replaced by a tendering system. At other times of the year, public intervention is officially closed for dairy products.[75] As described in section 9.1, the tendering system was activated during 2009 once the intervention system had been opened at the normal time and the fixed-price ceilings were reached. Other measures were taken. However, EU internal prices for SMP. WMP and cheddar did not start to recover from their lowest level until the second half of 2009. Although the recovery in the butter price began early in 2009 (possibly due to the earlier opening of private butters storage), it did not rise above the effective intervention price until mid-2009. This was also the case for SMP. Evidence at Member State level shows that this situation was experienced in a number of Member States and in some cases it persisted over a period of months. This evidence suggests that the complementary measures were not adopted quickly enough.

The exceptional market conditions occurring in late 2008-2009 highlight the fact that the parameters of the intervention system for dairy products, particularly the fixed buying-in period which coincides with the seasonal abundance of EU milk during the summer months, still reflects a context where EU dairy markets were heavily insulated from world markets and price fluctuations were internally generated,

[75] Regulation (EC) 1234/2007, Article 47, contains provision for special market measures in the cereal sector whereby, 'where the market situation so dictates', special intervention measures may be taken. These special measures would be triggered by disruptive falls (or the threat of such a fall) in the market price (in relation to the intervention price). However, no such mechanism exists for the dairy sector.

almost invariably by seasonal factors. However, in a more market-oriented context where EU dairy markets are potentially exposed to exogenous price volatility coming from the world market, which can occur in any period of the year, an intervention system calibrated on internally generated seasonality is unable to provide a year-round safety net.

Summary of findings for each indicator, EQ5

<table>
<tr><th>Indicator</th><th>Expected result</th><th>Evidence found</th></tr>
<tr><td>Comparison of movements in EU market prices and world market prices for individual dairy products</td><td rowspan="2">It was expected that more world price volatility would become transmitted to internal prices after the fall in the price gap and the weakening of the intervention system.</td><td rowspan="2">EU butter price: volatility was lower during 2004-7 than in the early 2000s, but was very high during 2008-9 – and for one year was higher than the volatility of world market prices.
EU SMP price: volatility was lower during 2004-7 than in the early 2000s, but became much higher in 2008-9, comparable to that of world market prices.
EU WMP price: volatility unchanged until end-2007 relative to the early 2000s, but during 2008-9 it matched that of world market prices.
EU Cheddar price: volatility during 2005-mid-2008 was lower than in the early 2000s. It then increased moderately, but remained well below that of world market prices. This is not a policy effect. It is explained by the structure of the EU market, where the volatility of world market prices transmitted via the prices of types of cheese that are heavily traded on the world market is partly absorbed (via substitution effects) by prices of less traded cheese.</td></tr>
<tr><td>Comparison of measured price volatility for the period before and after 2003 measured by the annualised standard deviation for butter, SMP, WMP and cheese</td></tr>
</table>

10 EQ6: Market balance

To what extent have the CAP measures applicable to the dairy sector contributed to balancing supply and demand for milk products?

10.1 Interpretation and comprehension of the key terms of the EQ6

The interpretation of supply, demand and balance used in addressing this question is the same as that set out in Evaluation Question 1 (see Chapter 5).

The milk products involved are listed in the Technical Specification of this project, namely:

- Butter
- Skimmed milk powder (SMP)
- Whole milk powder (WMP)
- Cheese
- Drinking milk
- Cream

The CAP instruments that potentially affect the demand of the above-mentioned products are a) consumption aid schemes aiming to increase domestic consumption b) export refunds. Imported supply depends on tariffs and tariff rate quotas (TRQs), which were rather constant over the period and are not explicitly evaluated here. These measures increase the total market off-take of end-users of dairy products (final demand). Domestic supply of dairy products depends on the total amount of milk produced, the overall capacity of the processing industry, and (for individual products) decisions concerning the relative shares of particular processed products in product mix. Total milk supply is strongly influenced by milk quotas, and as has been established in EQ1, has since 2003 become more responsive to the producer price of milk. There are no policy instruments that target the size or structure of the processing sector. Clearly, the level of intervention prices provides an incentive for processors to produce butter and SMP rather than products with higher value added. It is expected that, as intervention prices have fallen, the share of these products in the total supply of dairy products has fallen and it is expected that their structural surplus will also have fallen relative to that of other dairy products. Two further CAP instruments, public intervention stock-holding and private storage of milk products, also affect the market surplus in the short run, as they can be used to alter the timing of disposal of the products to end-users.[76]

10.2 Methodology used for answering EQ6

A market is in balance when supply equals demand, i.e. when there is no surplus or deficit. As was explained in Chapter 4, market balance is established more or less automatically in a market with perfect competition where prices and quantities are free to adjust. However, if quantities and prices are not free to adjust then market imbalances are likely to occur. When prices are supported at levels above the market-clearing price, excess supply accumulates on the market. Policy measures are then needed to deal with the resulting surplus.

[76] For more detail on the CAP measures aiming to reduce the imbalance between supply and demand of milk products, see section 3.1.

The methodology for addressing this evaluation question (see also EQ1a, Chapter 5) distinguishes between structural excess supply and market surplus. Structural excess supply is the excess of total supply on the market and total unsubsidised final demand. Market surplus is structural excess supply minus temporary demand for stocks (which will have to be returned to the market at a later time).

Structural balance for EU raw milk is given by equation (1):

Structural balance occurs when
EU domestic supply + imports = unsubsidised EU consumption + unsubsidised exports (1)

Any subsidised final demand that increase domestic demand beyond its level without subsidies or exports beyond what could be exported without subsidy are elements of the structural excess supply.

The structural excess supply is therefore defined as

Structural excess supply = subsidised EU consumption + subsidised exports (2)

In the analysis below, equation (2) is used to measure market imbalance and its evolution over time for each of the dairy products concerned.

10.3 Judgement criteria, indicators and information sources used for each indicator

The indicators and information sources necessary to analyse EQ1 are provided in Table 10.1.

Table 10.1 Indicators, data requirements and information sources for EQ6

Indicator	Data requirement	Information sources (2000-2009)
Structural excess supply of Butter, SMP, WMP, cheese	Production in dairies Subsidised exports Change in intervention (public) stocks Change in subsidised private stocks Demand resulting from domestic aids to consumption	DG AGRI (various years) DG AGRI (unpublished)

The indicator is calculated for each of the four products shown in Table 10.1. It has not been possible to calculate an indicator for drinking milk and cream for lack of data.

Production in dairies and trade flows for cheese, butter and SMP have been taken from DG AGRI's annual agricultural statistical report (various years). Figures on aided consumption and changes in intervention stocks have been taken from the same source. Data on the quantities of butter, SMP, WMP and cheese exported with refunds as agricultural products (i.e. not including non-Annex 1 subsidised amounts) have been provided by DG AGRI (unpublished data).

The impact of the CAP policies and changes in those policies is judged by examining the trends in the structural excess supply for each dairy product before and after the 2003 policy changes.

10.4 Results and analysis

The structural excess supply is presented for each product separately. The figures on which the reasoning is based refer to the EU within its boundaries in the year of observation. Thus, up to and including 2003, the 'EU' refers to EU-15, and so on. The years shown in the tables are calendar years.

10.4.1 Butter

Table 10.2 shows the total supply (production + imports) and the structural excess supply of butter in the EU. Two enlargements increased production capacity as new member States joined the EU. This masks the fact that, after about 2004, the underlying trend in production in each of the regions of the EU was slightly declining. Aided consumption was between about 530 and 600 thousand tonnes up to and including 2006, but in 2007-2009 it was well below previous levels. From 2008 onwards all programmes targeting domestic consumption of butter ended except those open to certain non-profit making bodies. Exports with refunds were also lower in these years and no refunds were paid for butter in 2008 since the world market price was higher than the EU's effective intervention buying-in price. The years 2004 to 2007 were years of net selling-off of intervention stocks. In 2009, intervention stocks were accumulated again. There was also de-stocking by private stockholders who benefited from storage subsidies during most of the period.

The result of these various activities for the structural excess supply of butter is that it peaked in 2002, fell very gradually until (and including) 2006 and then dropped quite steeply in the last three years shown in Table 10.2.

Table 10.2 Structural excess supply for butter in the EU-15/25/27, 2000-2009, 1,000 t [1]

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Production in dairies	1,929	1,836	1,770	1,969	2,162	2,214	2,128	2,150	2,140	2,100
Imports	106	116	117	116	93	83	92	93	65	62
Subsidised consumption	538	551	533	535	600	564	607	235	18	12
of which:										
Food processing	462	476	465	490	490	479	475	155	0	0
welfare schemes	32	32	27	3	27	34	45	24	0	0
non-profit making bodies	30	29	27	27	24	24	22	22	18	12
butter concentrate	14	14	14	14	15	15	15	5	0	0
Subsidised exports	187	176	276	303	339	306	236	131	0	163
Net change in stocks[2]										
Public (intervention)	9	4	124	31	-63	-39	-58	-63	0	77
Private, aided by EU	-7	18	-25	-1	-4	-1	-13	16	-12	-11
Structural excess supply (SES)	725	727	809	838	939	870	843	366	18	175
SES as % of total supply	35.6	37.2	42.9	40.2	41.6	37.9	38.0	16.3	0.8	8.1

Notes: 1) For 2000-2003: EU-15, for 2004-2006: EU-25, and for 2007-2009: EU-27. 2) The change is given as closing stocks minus beginning stocks.

Source: DG AGRI (various years and unpublished); own calculations.

10.4.2 SMP

Changes in the structural excess supply of SMP follow a similar pattern as those of butter and are shown in Table 10.3. It increased until 2002, after which it started to decline. The decrease is associated with the declining production of SMP from 2004 onwards, to the slight increase of non-aided consumption and to a decrease of imports. The non-subsidised exports varied between the years but the total exports remained rather unchanged.

The structural excess supply of SMP shows the impact of the 2003 reforms from 2005 onwards. regarding market intervention measures. The subsidised consumption refers to the use of SMP in animal feed (for calves), which was abolished from 2007. Subsidised exports and intervention stocks adjusted downwards because they are linked to the intervention price for SMP, which was gradually reduced by 5% between 2004 and 2006 and was further reduced by 3% between 2007 and 2008 (Table 2.40).

Table 10.3 Structural excess supply for SMP in the EU-15/25/27, 2000-2009, 1,000 t[1]

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Production in dairies	961	953	1,016	976	955	965	864	919	863	964
Imports	78	57	69	94	26	7	19	10	8	6
Subsidised consumption	476	326	436	426	414	362	264	0	0	0
Subsidised exports	287	86	270	182	222	190	21	0	1	255
Net change in stocks[2]										
Public (intervention)	-173	-7	141	53	-129	-65	0	0	0	258
Private, aided by EU	0	0	0	0	0	0	0	0	0	0
Structural excess supply (SES)	763	412	706	608	636	552	285	0	1	255
SES as % of total supply	73.4	40.8	65.1	56.8	64.8	56.8	32.3	0.0	0.1	26.3

Notes: 1) For 2000-2003: EU-15, for 2004-2006: EU-25, and for 2007-2009: EU-27. 2) The change is given as closing stocks minus beginning stocks.

Source: DG AGRI (various years and unpublished); own calculations.

10.4.3 WMP

Table 10.4 shows that, as there were no consumption aids for WMP, the entire structural excess supply had to be exported. Up to and including 2006, a significant share (44-64%) of total supply of WMP was exported with the aid of refunds. As for SMP, there is considerable annual variation in the SES for WMP. Therefore, it is unwarranted to interpret the slightly lower figure in 2006 as the beginning of a downward trend that might be attributed to the policy reforms. Instead, the behaviour of the structural excess supply for WMP is best described as fluctuating around a stable level up to 2006, then disappearing in 2007 and 2008 due to a sharp increase in non-subsidised exports in 2007-2008, due to the world market commodity boom.

Table 10.4 Market excess supply for WMP in the EU-15/25/27, 2000-2009, 1,000 t[1]

	2000[2]	2001[2]	2002[2]	2003	2004	2005	2006	2007	2008	2009
Production in dairies	891	836	799	793	858	849	788	796	878	790
Imports	3	5	9	8	4	3	2	2	1	1
Subsidised exports	497	398	518	446	443	420	349	0	0	91
Structural excess supply (SES)	497	398	518	446	443	420	349	0	0	91
SES as % of total supply	55.6	47.3	64.1	55.7	51.4	49.3	44.2	0.0	0.0	11.5

Notes: 1) For 2000-2003: EU-15, for 2004-2006: EU-25, and for 2007-2009: EU-27.2) The subsidised exports for those years have been estimated as 50% of the subsidised exports for the category 'other milk products'.

Source: OECD-FAO (2011); own calculations.

Although there is no intervention for WMP, its price is linked closely to those of the intervention products butter and SMP. When butter and SMP prices are low relative to that of WMP, some producers switch their production away from the two intervention prices to WMP. The analysis of EQ 5 (see Chapter 9) shows that, from early 2007 until the end of 2008, EU prices and world market prices for WMP virtually coincided. This explains why the use of export subsidies for this product became irrelevant in these two years. For much of that period, the EU intervention prices for butter and SMP were also below world market price levels for those products.

10.4.4 Cheese

Table 10.5 shows the structural excess supply of cheese in the EU. Cheese production in the EU grew in most years after 2000, even after the effect of two enlargements is taken into account. The structural excess supply, which remained above 4% of total supply during 2000-2004, was significantly lower as a share of supply in 2005 and 2006, and fell very sharply in 2007-2008 because of an increase in unsubsidised exports. An additional two million tonnes were disposed of without subsidy in 2009 compared with 2000. This illustrates the growing consumer preference for cheese both in the EU and abroad, even after taking account of the fact that the two enlargements also brought more cheese consumers into the EU.

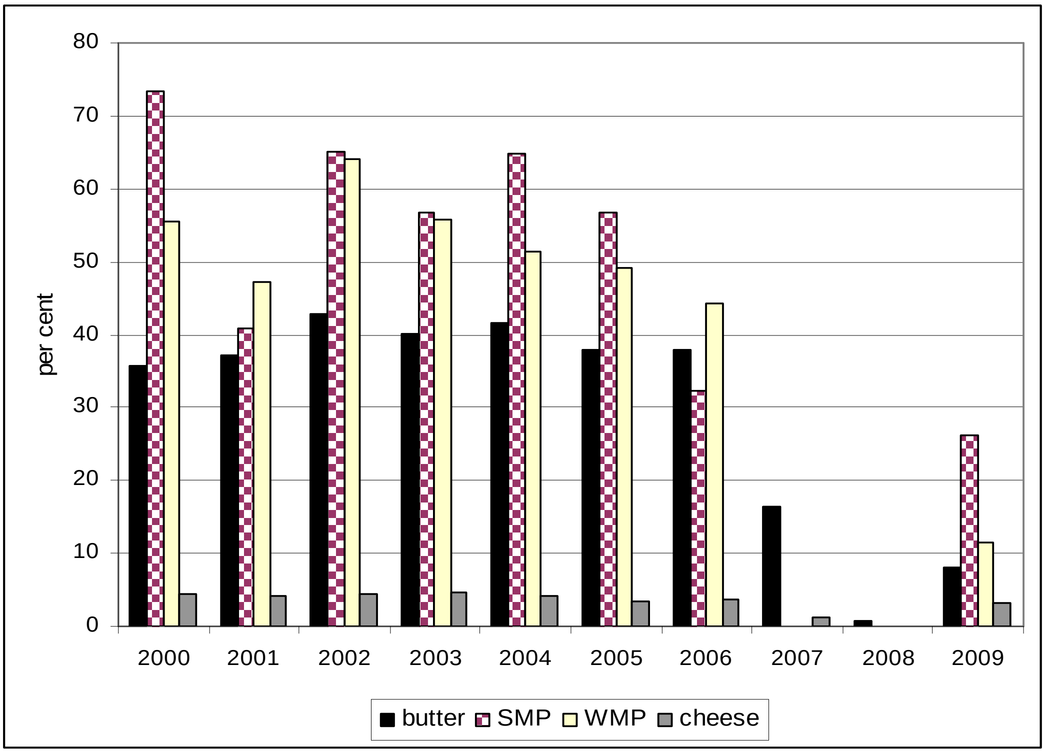
Disposal aids are not given in the EU for any type of cheese. Hence, the annual variations of the market excess supply are due only to annual variations in subsidised exports. Starting in 2003, EU cheese prices were lower than in previous years, and remained at the lower level until 2007. Since none of the other market intervention measures directly target cheese, this decline in prices is probably an indirect effect of lower intervention prices for butter and SMP and undoubtedly facilitated the expansion of EU demand during that period. Private storage aid is granted for the seasonal storage of specific types of cheese and aims to address short-term imbalances in the market. The volumes involved are not shown in the table, and are not required to calculate the SES.

Table 10.5 Structural excess supply for cheese in the EU-15/25/27, 2000-2009, 1,000 t[1]

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Production in dairies	6,682	6,986	6,983	7,084	8,087	8,306	8,522	8,676	8,710	8,679
Imports	149	176	156	175	112	102	108	94	84	84
Subsidised exports	306	294	314	330	329	291	319	111	2	262
Structural excess supply (SES)	306	295	316	333	333	296	325	118	10	271
SES as % of total supply	4.5	4.1	4.4	4.6	4.1	3.5	3.8	1.3	0.1	3.1

Notes: 1) For 2000-2003: EU-15, for 2004-2006: EU-25, and for 2007-2009: EU-27.
Source: DG AGRI (unpublished).

Figure 10.1 Structural excess supply as share (%) of total EU supply of butter, SMP, WMP and cheese, 2000-2009



Sources: as for the tables above.

Figure 10.1 shows that the dairy products with the largest share of production classified as structural surplus were in every year (except 2007 and 2008) one or other of the milk powders. The SES of these two products also show more annual variation than is the case for butter and cheese. Structural excess supplies nearly disappeared for all products in 2007-2008. It is not possible to say whether the higher excess supplies observed in 2009 mark a return to the situation prior to 2007 or merely a temporary increase due to the depressed state of the EU milk sector in 2009.

10.4.5 Drinking milk

The production of drinking milk is reported in Table 2.22. Imports and exports of drinking milk are limited. According to IDF (various issues), exports of drinking milk accounted on average over the period 2000 to 2005 only 0.5% of production, and in 2009 16,000t of drinking milk were imported (IDF, 2010). This implies that almost all of the drinking milk produced in dairies is consumed domestically.

One CAP measure targets the consumption of drinking milk, namely the school milk programme. It has not been possible to find time-series data on the quantity of milk that is disposed of in this programme.[77] This policy is not evaluated in the present report. However, as they represent an item of assisted consumption, they should be recognised as part of the support to the sector.

10.4.6 Cream

The annual production of cream during 2000-2009 was around 2 million tonnes (about 5% of total fresh dairy products, according to DG AGRI, various years) and scarcely varied throughout this period. There is hardly any trade in cream. Eurostat data show that exports from the EU over 2000-2009 were rather stable, varying between 28,000 and 33,000 tonnes. Exceptions were the years 2003, 2009 and 2010, when 40,000 tonnes were exported. The imports from third countries are very small and were the highest in 2002 (4,750 tonnes). Thus, total consumption in the EU has been almost as high as the production.

10.5 Conclusions

The EU's structural excess supply for butter and cheese declined in 2005 and 2006, due to increases in unsubsidised demand. The structural surpluses for SMP and WMP remained rather constant until 2005 (SMP) and 2006 (WMP), and then fell very sharply. Until 2005 or 2006 (depending on the product) internal consumption aids and export refunds were maintained at levels comparable to the earlier part of the decade. These measures made it possible over this period to release intervention stocks, which were absorbed without disrupting the market. Clearly, these results imply that unsubsidised consumption (internal and/or external) was rising.

The evidence that these falls in structural excess supplies were a direct result of CAP policy changes is not strong. If the 2003 policy changes had caused significant falls in dairy product prices, it could be argued that the increases in unsubsidised demand were a response to these lower prices, and the link with policy reform would be established. However, the findings on EU price changes assembled for EQ5 shows that although the EU price for butter began to decline slowly from 2004 onwards, the prices for the other three products were more or less stable during 2003-2006 (although the gap relative to the world market price was gradually shrinking due to weak trends in the latter prices). Thus, it is not warranted to conclude that the reduction in the structural surpluses of all dairy products was systematically driven by lower prices as a result of the policy reforms. With the exception of butter, it is hard to find support for a direct link between the policy changes underway after 2003 and the shrinking structural surpluses after 2004.

The last three years examined – 2007-2009 – were marked by instability on world markets, and dramatic changes in the relationship between EU and world market prices for the first three products (see EQ5), which mask any internal policy impacts that may have also been present.

[77] In the 2006/2007 school year, the equivalent of 305,000 tonnes of milk was distributed in schools in 22 Member States with Community expenditure of more than €50 million (DG AGRI website). Figure 13.4 gives some information about EU budget expenditure on this programme, but not the volumes of milk involved.

Summary of findings for each indicator, EQ6

Indicator	Expected result	Evidence found
Structural excess supply of Butter, SMP, WMP, cheese	Structural excess supplies are expected to decline as the expected price falls stimulate unsubsidised internal and external demand.	The expected declines in SES were found, starting earlier and more gradual for butter and cheese, starting a year or so later and steeper for SMP and WMP. The main factor driving these falls was an increase in unsubsidised demands. However, in the absence of lower product prices (apart from weak evidence regarding lower butter prices), the link with policy changes cannot be established.

11 EQ7: Structure of dairy industry

To what extent have the CAP measures applicable to the dairy sector influenced structural changes in the processing sector?

11.1 Interpretation and comprehension of the key terms of EQ7

The question in EQ7 relates to structural change in the processing sector and how this has been changed due to the 2003 CAP reform for milk and milk products evaluated in this project.

A first step to answer the question is to check whether there have been structural changes and a second step is to check if they are related to the CAP reform.

Structural change is related to production capacities but also to the number of firms, entry and exit, merging activities. In the long run the structure of an industry depends on a) the intensity of competition, b) the nature of the goods, c) the size of the market and d) the characteristics of the technology (Sutton, 1991).

The CAP measures that potentially affect supply and demand of milk products (analysed in EQ6) and affected price stability (EQ5) in the milk processing sector can indirectly cause structural changes in the dairy sector. This question aims in pointing out these indirect effects.

11.2 Methodology used for answering EQ7

11.2.1 Methodology

Structural changes in the processing sector are identified by looking at the evolution of the sector and describing changes in the number of firms, their share in processing milk and in their concentration ratio.

The concentration ratio is used to show if the biggest dairy processing firms control the market. It has been calculated for the biggest dairy processors and shows their market share (in %). It is given as follows:

$$CR_m = \sum_m S_i \qquad (1)$$

Where: CR: concentration ratio
Si: market share if firm i
m: number of firms

The concentration ration can range between 0 and 100% indicating perfect competition and monopoly respectively. Changes of the concentration ratio as well suggest restructuring of the dairy processing sector.

A survey developed for dairy processing firms gave more insights into how the CAP measures affected and changed the structure of the interviewed firms. In total 42 processors in 10 Member States were interviewed. It should be noted that these processors are the ones who accepted to answer the questionnaire. The number of processors who have been approached was higher.

On a second step, changes in the structure are combined with the conclusions of the previous EQs and in particular of EQ6 in order to synthesise and to link structural changes with the effects of the CAP reform on the supply and demand of milk products.

11.2.2 Limitations and difficulties faced

Serious difficulties were faced in gathering the information for the survey to processors, and in several cases also in the gathering of systematic information about factual changes.

The questionnaire consisted of 34 questions, which covered all the topics in the evaluation questions in Theme 1 (raw milk) and Theme 2 (milk products). The questionnaire was not only extensive, but also asked the respondents for detailed information about issues that are generally considered to be sensitive and confidential. For example, information was asked about the payment system they were using and the way in which this system was applied to determine the milk price. The processors were asked to answer about how important they perceive competition with other dairies in the formation of the milk price they pay to farmers. Moreover, information was asked on the response to market signals and policy incentives in the dairy product markets, as well as on the strategic choices behind product mix orientation and adjustments.

Pilot pre-testing interviews were done in the Netherlands and Germany in order to improve the questionnaire, while additional stakeholders were consulted. The questionnaires were filled in during a face to face interview with a high ranked employee of the dairy company. This was a necessary condition because of the detailed information the questionnaire was asking. Interviews were done as much as possible by senior interviewers, with an extended experience in the dairy sector.

The Commission provided a letter of recommendation which was sent to the dairies together with the request for the interview informing them about the background of the research and the confidentiality of information-use. The response rate was very low and as the dairies explained the questions were asking for sensitive information. It appeared that it was not in the interest of the dairies to share this information with third parties. In addition to this, the dairies also knew that a number of colleagues would be asked the same questions. Most likely this added to the fear that sensitive information via this process might come into the hands of competitors, although it was promised that confidentiality and anonymity would be respected. Moreover, some dairies indicated that their position was so specific that it would be impossible to guarantee anonymity because insiders in the sector would be able to trace back their identity from the information on the firm’s structural characteristics, which was also part of the questionnaire.

After a disappointing response in the first round in most of the Member States where case studies were done, a second attempt was made where it was tried to more intensively utilise network relationships to convince more (and other) dairies to participate. This helped to get a minimum of 2 or 3 participating dairies per case study region.

It should be noted that when dairies accepted to participate, they could still decide (and they indeed did) not to answer certain questions. Moreover, the sensitivity could make them behave in a strategic way, which introduces potential biases in the responses obtained.

A protocol was made with respect to the gathering of factual information, aiming at generating systematic and standardised information about the structure of the dairy industry in a case study Member State. The efforts made in this respect include a detailed assessment of available national statistics, contacts with national branch organisations, checks of annual reports of key dairies, and interactions with dairy experts. Although this generated a lot of information, it turned out to be difficult to create a systematic data base over Member States from this data (except for a number of rather general indicators such the number of dairies and aggregated production and trade data).

The problems faced impose limits on the analysis and imply that where results are presented they should be treated with care. For this reason no clear and absolute conclusions can be made based on the information from the questionnaires (small, non-representative samples, potential of strategic behaviour).

11.3 Judgement criteria, indicators and information sources used for each indicator

Table 11.1 summarises the indicators and information sources used to address EQ7.

Table 11.1 Indicators, data requirements and information sources for EQ7

Indicator	Data requirement	Information sources
Overview of the EU dairy processing sector - Identification of structural change		
- Evolution of the EU dairy processing sector per Member State - Market share of EU dairy firms worldwide - Concentration ratio of the biggest dairy firms per Member State	Number and size of dairy enterprises per Member State Processed milk by dairy enterprises per Member State Concentration ratio	EUROSTAT, Structural Business statistics, Productschap Zuivel (Netherlands) IDF
Linkage of structural changes with CAP reform		
- Answers of interviewed processing companies	Answers from survey questions	Processors survey

It should be noted that the CAP reform and in particular the decrease of the intervention price for butter and SMP can have a positive effect in increasing competition among the dairy companies. This is because of the associated decrease of the gap between the EU producer prices and the world market prices. A more intense competition is suggested by a decrease in the number of firms and by an increase of the concentration ratio.

11.4 Results and analysis

11.4.1 Evolution of the EU dairy processing sector

In 2009 there were 5,416 dairy processing enterprises[78] in the EU, which processed 111 million tonnes of milk (Table 11.2). The majority of them are located in the EU-15 and in particularly in Italy (25% of the registered enterprises), Greece and Spain, but their production capacity is limited as they process only 13.6% of the total milk collected in the EU. France and the United Kingdom, two of EU´s biggest producers of raw milk, follow in the fourth and fifth places in terms of numbers of enterprises, while Germany, which had the highest milk supply to dairies in 2009, follows in the sixth place with 194 registered enterprises. In the Netherlands in 2009 16 enterprises processed 9.6% of the EU’s raw milk supply to dairies.

In the EU-10 were located 9.8% of the EU’s enterprises and processed 12% of the EU’s raw milk supply. Among the EU-10, in 2009 the Polish and Czech enterprises processed 7.4% and 1.8% of the EU’s raw milk supply to dairies respectively. The number of enterprises was high in Romania (337) and in Bulgaria (170) but their processing capacity was up to 1.3% of the EU’s total milk supply to dairies.

The total number of enterprises in the EU declined between 2003 and 2009 with the decline being higher in Italy, the UK and France. The reasons for the decline are not the same for all Member States. In some Member States also the average milk processed per enterprise decreased suggesting that fewer enterprises remained in business (case of Austria and France). In Italy the average milk processed per enterprise increased pointing out to a consolidation process towards less but bigger enterprises.

In other Member States, like Spain, Portugal, Greece, Hungary, Latvia and Slovakia, the number of enterprises increased, but on average the enterprises processed less milk. One reason for this

[78] In this section the term enterprise follows the definition of Council Regulation (EEC) No 696/93 and refers to milk processing firms that are identified as legal units. The reader should note that an enterprise may have one or more factories processing milk.

development can be seen in the specialisation of production (for example in Spain, in Portugal and in Greece; see also Table 11.2) but also in transformation processes (especially in EU-12 Member States).

In the Netherlands and in Sweden, where the processing sector is highly consolidated, the number of enterprises increased between 2003 and 2009 but there the decrease of the average quantity of processed milk per firm was the highest. In these Member States new enterprises were established additional to the ten existing enterprises between 2003 and 2009.

These developments collide favourably with the findings of the own survey among dairy processors. The survey results suggest that there is a dynamic process of consolidation in the processing sector. In some EU Member States, such as the Netherlands or Germany, dairy companies have adopted a strategy to create large scale international dairy operations so as to be able to compete with foreign companies outside the EU. Due to the capped milk production because of the milk quota, other companies followed a second strategy. They looked to gain economies of scale through the construction of larger plants to replace less efficient smaller and older ones. Finally in Italy, more restrictive health standards and food safety controls also forced some firms to quit.

Table 11.2 Number of dairy enterprises and quantity of milk processed by dairy enterprises per Member State in 2003 and 2009

	Number of enterprises			Processed milk[1] (1,000 t)			Average processed milk per enterprise (1,000 t)		
	2003	2009	Change 2003-2009	2003	2009	Change 2003-2009	2003	2009	Change 2003-2009
EU-15									
Austria	86	79	-7	2,644	1,660	-984	30.7	21.0	-9.7
Belgium	69	50	-19	2,830	2,945	115	41.0	58.9	17.9
Denmark	26	27	1	4,518	4,716	198	173.8	174.7	0.9
Finland	23	16	-7	2,398			104.3		
France	468	414	-54	10,910	6,858	-4,052	23.3	16.6	-6.7
Germany	201	194	-7	27,431	28,615	1,184	136.5	147.5	11.0
Greece	649	815	166	1,362	1,385	23	2.1	1.7	-0.4
Ireland	63			5,310			84.3		
Italy	1,707	1,439	-268	9,175	8,627	-548	5.4	6.0	0.6
Luxembourg	3			176			58.7		
Netherlands	14	21	7	10,373	11,713	1340	740.9	557,8	-183,1
Portugal	188	178	-10	666			3.5		
Spain	570	616	46	6,605	5,150	-1,455	11.6	8.4	-3.2
Sweden	10	14	4	3,206	3,972	766	320.6	283.7	-36.9
United Kingdom	622	456	-166	14,195			22.8		
EU-10									
Cyprus		79			190			2.4	
Czech Republic	55	38	-17	2,601	1,970	-631	47.3	51.8	4.6
Estonia	23	18	-5	485	412	-73	21.1	22.9	1.8
Hungary	53	75	22	1,719	530	-1,189	32.4	7.1	-25.4
Lithuania	20	11	-9	954	593	-361	47.7	53.9	6.2
Latvia	43	65	22	436	236	-200	10.1	3.6	-6.5
Malta	1			40			40.0		
Poland		190			8,154			42.9	
Slovenia	95			499			5.3		
Slovakia	32	49	17	973	593	-380	30.4	12.1	-18.3
EU-02									
Bulgaria		170			529			3.1	
Romania		337			876			2.6	

Notes: 1) Milk processed refers to raw milk delivered to dairies

Source: Eurostat (2011), Productschap Zuivel (2010).

Table 11.3 shows the distribution of enterprises based on how much cheese they produced in 2003 and in 2009. The number of enterprises in the EU declined over this period from 4,378 up to 4,113, although cheese production increased. In Italy the number of enterprises decreased and based on the own survey this was because of changes in the processing of PDO and PGI cheeses (fewer companies processed more high added value cheese). Spain and Greece recorded the highest increase in the number of enterprises.

Table 11.3 Distribution of enterprises by volume of annual production of cheese, 2003 and 2009, number of enterprises in 1000

	< 100t	101t - 1,000t	1,001t - 4,000t	4,001t - 10,000t	> 10,000t	Sum 2003	< 100t	101t - 1,000t	1,001t - 4,000t	4,001t - 10,000t	> 10,000t	Sum 2009
	2003						2009					
EU-15												
Austria	27	43	8	6		86	26	32	8	8		
Belgium	48		8			57	0	0	4	5		
Denmark	17		10			30	6	7	7	3	3	26
Finland	16		6			23	10	7				22
France	125	312	65	39		581	106	277	67	34	40	524
Germany	27	41	17	14		150	44	31	16	14	48	153
Greece	319	218	21	3		562	340	229	29	4	3	605
Ireland												
Italy	847	1,005	172	33		2,066	733	860	195	41	10	1,839
Luxembourg	0	1	1	0		2						2
Netherlands	0					8		4			6	
Portugal	150	50	8	5		213	134	52	7	4		
Spain	266	153	32	5		462	333	154	34	6	7	534
Sweden	4		5			12	1	1	4	2	2	10
UK	45	35	24			112	127	19	14	5	8	173
EU-10												
Cyprus							51	12	2	1	0	66
Czech Rep.	15		28			45		9	14	6		33
Estonia	15		7			22	6	5	3	4	0	18
Hungary	24		15			44	20	11	9			45
Latvia	14		7			36	0	13	7	1	0	24
Lithuania	29		5			20	3	4	3	3	3	13
Malta	0		1			1	0	0	0	0	0	0
Poland	37	117	70	25		258	13	80	55	27	12	187
Slovakia	8		5			13						
Slovenia		13	15			31		10	9		0	27
EU-02												
Bulgaria							75	91	18		0	
Romania							188	129	12	1	0	330

Note: This table is based on a survey from Eurostat on the dairy processing sector in Member States. Gaps in the data may arise from incompleteness in response or non-response. Moreover, in order to ensure anonymity of the respondents no numbers are reported when the number of responding firms in a certain size class is less than a threshold.

Source: Eurostat.

Table 11.4 shows the distribution of the enterprises based on how much butter they produced in 2003 and in 2009. Here noticeable are changes in the evolution of the enterprises per size classes moving from enterprises producing 100 tonnes or less to enterprises with a production capacity more than 1,000 tonnes.

Table 11.4 Distribution of enterprises by volume of annual production of butter, 2003 and 2009, number of enterprises

	< 100t	101t - 1,000t	1,001t - 5,000t	5,001t - 10,000t	> 10,000t	Sum 2003	< 100t	101t - 1,000t	1,001t - 5,000t	5,001t - 10,000t	> 10,000t	Sum 2009
	2003						2009					
EU-15												
Austria	54	8	7	0		70	47	4	5			
Belgium	35		8			48	19	6	3			34
Denmark	9		5			15	10	4	1	0	1	16
Finland	11		2			14	3		2	0		8
France	162	23	20	4		222	130	14	17		11	173
Germany	30	38	17	9		109	35	16	12	6	16	85
Greece	73	3	0	0		76	85	3	0	0	0	88
Ireland												
Italy	865	91	14	5		976	499	64	14			582
Luxembourg	1	0	1	0		2						2
Netherlands	0	0		0		3						
Portugal	8	5	3	0		17	8	3	3	0		
Spain	22	10				40	19					30
Sweden	0					3	1	0	2	0	1	4
UK	56		5	2		68	44					53
EU-10												
Cyprus							1	0	0	0	0	1
Czech Rep.	16		12			29		5	9		0	17
Estonia	8		3			11	7	4	3	0	0	14
Hungary	16		4			20	7	8		0	0	
Lithuania						23	8	5	2	0	0	15
Latvia	9		5			14		3	5	0	0	9
Malta							0	0	0	0	0	0
Poland	68	104	27	3		205	50	68	15	5	2	140
Slovenia						7						
Slovakia	7	13	5	0		25	3	11	3	0	0	17
EU-02												
Bulgaria							48	3	0	0	0	51
Romania							44	8	3	0	0	55

Note: This table is based on a survey from Eurostat on the dairy processing sector in Member States. Gaps in the data may arise from incompleteness in response or non-response. Moreover, in order to ensure anonymity of the respondents no numbers are reported when the number of responding firms in a certain size class is less than a threshold.

Source: Eurostat.

The enterprises are organised in two general forms: in private dairy companies and in cooperatives. The main differences refer to the contractual arrangements.

A dairy cooperative business is owned, operated, and controlled by the dairy farmers who benefit from its services. Members finance the cooperative and share in profits it earns in proportion to the volume of milk they market through the cooperative. In cooperatives the relations between producer and processors are based on the cooperative membership principle. Farmers are members of the cooperative. Specific is the obligation of the dairy to buy all milk delivered from the farmer. Member-farmers are obliged to deliver exclusively to the cooperative. Milk prices are determined by governing bodies of the cooperative. The prices are ex-post indicative prices and the same for all members.

In private dairies the contractual relations are designed in such a way, that farmers deliver a fixed quantity of raw milk. These contracts often have an annual character and have to be renegotiated each year. Since private dairy businesses strive to maximize their own profits, they have an interest to pay a relatively low price for the raw milk.

In 2009 about 58 % of raw milk produced in EU was delivered to cooperatives. About 20 % of the delivered milk was based on individual contracts to private dairies (DG AGRI, 2009). The own survey among dairy processors revealed differences between Member States. While in Latvia or Spain the share of processed milk in the total milk processed by cooperatives was 6.1% and 21% respectively, it was almost 100% in Ireland. Cooperatives have also a high presence in the Dutch dairy industry. In terms of the amount of milk processed, their market share covers 80%.

Because of their specific nature, cooperatives are a vehicle to strengthen or increase the market power of farmers *vis a vis* players in other stages of the supply chain (e.g. competing processors, retailers). Some of the biggest dairy companies in the EU like FrieslandCampina, Nordmilch or Arla are organised as cooperatives.

11.4.2 Market share of the EU's dairy firms in world markets

The biggest European milk processors were in 2009 among the top 20 biggest milk processors worldwide and covered 7% of the world production (Table 11.5). They are located in the Netherlands, in Sweden and in Denmark. Friesland Campina from the Netherlands along with Arla from Sweden/Denmark covered 1.6% and 1.2%, respectively, of the world´s processed milk. The French companies Lactalis and Danone are operating plants internationally and processed a share of 1.3% and 1.0%, respectively, of the world´s milk. Other European companies like Nordmilch (Germany), Bongrain (France), Parmalat (based in Italy with plants internationally) and Glanbia (Ireland) are also included in the ranking. The ranking of the European companies in this overview shows the dominant role of cooperatives in Europe. Cooperatives like FrieslandCampina, Arla Foods and Nordmilch play an important role on the global markets.

The companies listed in Table 11.5 process in total 21% of the world's milk intake.

Table 11.5 The world's biggest dairy firms by milk intake in 2009

Company	Legal Form	Country	Main location of processing plants	Milk intake (million milk equivalent)	Market share (% of world production)
Fonterra	cooperative	New Zealand	International	18.6	2.7
Dairy Farmers of America	cooperative	USA	USA	16.2	2.3
Nestlé	public	Switzerland	International	12	1.7
Dean Foods - USA	public	USA	USA	11.8	1.7
FrieslandCampina	**cooperative**	**Netherlands**	**Netherlands**	**11.3**	**1.6**
Lactalis	**private**	**France**	**International**	**8.9**	**1.3**
Arla Foods	**cooperative**	**Sweden**	**Denmark/Sweden**	**8.3**	**1.2**
California Dairies Inc.	cooperative	USA	USA	7.7	1.1
Danone	**public**	**France**	**International**	**7.3**	**1**
Kraft	public	USA	International	6.7	1
Land O´Lakes	cooperative	USA	USA	5.5	0.8
Saputo	private	Canada	Canada/ USA	4.3	0.6
Nordmilch	**cooperative**	**Germany**	**Germany**	**4.2**	**0.6**
Schreiber Foods	private	USA	USA	3.7	0.5
Bongrain	**private**	**France**	**France**	**3.6**	**0.5**
Parmalat	**public**	**Italy**	**International**	**3.5**	**0.5**
Murray Goulburm	cooperative	Australia	Australia	3.2	0.5
Northwest Dairy Assoc.	cooperative	USA	USA	3.1	0.4
Mengniu Group	public	China	China	2.9	0.4
Glanbia	**public**	**Ireland**	**Ireland/USA**	**2.8**	**0.4**
Sum				**145.6**	**20.8**

Source: IFCN, 2009.

The biggest milk processing company worldwide in terms of milk intake was in 2009 Fonterra from New Zealand, with plants located internationally and a market share of 2.7%. The ranking of Fonterra with regard to turnover was in the same year behind the European Companies Danone, Lactalis and

FrieslandCampina. This is probably due to its specialisation in producing milk powder. The European Companies are, in a relative sense, more and more focused in the production of higher valued cheese.

11.5 Concentration ratio

The concentration ratio has been calculated depending on data availability only for the Member States where case studies have been conducted (Table 11.6).

The concentration ratio increased in the selected Member States apart from Germany suggesting a restructuring process towards larger milk processing companies. The biggest increase was realised in Italy, with a change in the CR of the four biggest companies of 74% over the period (to remind the reader, Italy is the country with the highest number of milk processing enterprises). However the Italian concentration ratio is still low compared with other Member States.

Table 11.6 Change of concentration between 2003 and 2009 in selected Member States

Member State	measure of concentration[2]	2003	2008	2009	% change between 2003 and 2009
Spain	CR3	27.5		30.4	10.5
Austria	CR4	40		42.6	6.5
Italy	CR4	7.7		13.4	74
Latvia	CR4	57.3		66.6	16.2
Germany	CR6	31.5		26.6	-15.6
Netherlands[1]	CR5		80		
Hungary[1]	CR4		55		

Notes: 1) based on European Commission (2011); 2) the concentration ratio is given for the three biggest companies in Spain, the four biggest companies in Austria, Italy, Latvia and Hungary, for the five biggest companies in the Netherlands and for the six biggest companies in Germany

Source: own calculations.

In the Netherlands the concentration ratio was particularly high with a CR5 of 80 in 2008. Also Hungary shows a relatively high rate of concentration with a CR4 of 55 in 2008, although the number of enterprises increased between 2003 and 2009 (see Table 11.2). This can be considered as evidence that next to the four biggest enterprises, operate a great number of small and specialised enterprises.

11.6 Impact of dairy policy measures on structural change in the processing sector

This section uses the information from the own survey among 42 processors in 10 Member States.

The interviewees were asked if there was a direct impact on the structural development of the dairy processing sector because of CAP measures for milk and milk products of consumption aids for butter, SMP and cream, export subsidies, national aids as well as rural development aids.

They generally confirmed that the CAP instruments had a limited impact on the structural development of their dairies. They suggested that they rather responded to market signals and that they generally try to respond to market competition and the demand of wholesalers. In many cases the degree of competitiveness was indicated to be high, especially for those not operating in a niche market. This was particularly stressed by the Italian processors, who expanded their processing units in order to respond to increasing demand for high added value cheese. Investment strategies, innovation in dairy products, quality of industrial processes and the business impact of competitors are the driving factors of any restructuring of the dairies. Having larger plants allows them to reduce production costs per unit and to increase the labour productivity.

They stated that the changes in the CAP measures were not of such a big magnitude so as to result into restructuring of the processing sector.

In detail, regarding the reduction of the intervention price for butter and SMP since 2004 only in France the processors agreed that this was the most important factor affecting negatively the prices but still they did not consider that this affected price stability and recognised that price instability was mainly imported. They concluded hence that the reduction of the prices because of the CAP policies did not provoke any restructuring of the processing sector.

It should be noted that several of the interviewed processors did not export outside the EU and because of this they had no direct experience with export refunds. Several other processors did not make any use of private storage. Hence the downwards adjustment of subsidised exports and private storage did not affect their production and marketing strategies.

While the gradual expansion of the quota did not lead to any structural changes, according to the interviewed processors it is seen as positive because it keeps milk production in a certain region (in particular when no free quota exchange is allowed, e.g. in LFAs such as Franché Comté). For the same reason LFA payments, payments within Rural Development Programmes and national aids on milk production were considered as positive by some processors and argued to be contributing to the preservation of their resource base.

11.7 Conclusions

The limitations mentioned in Section 11.2.2 (notably limited response of the dairy processing industry to the own survey among dairy processors, incomplete answers, potential bias in answers due to incentives not to reveal sensitive information to third parties, non-representative and limited sample), do not allow to draw any clear and absolute conclusions as to what extent the CAP measures applicable to the dairy sector have influenced structural changes in the processing sector. Some tendencies however were observed.

The first part of the analysis of this EQ (see Section 11.4.1) suggests that, in general, the number of dairy enterprises declined during 2003 and 2009, while the remaining enterprises were larger and processed more milk. However, the picture is heterogeneous among the Member States. In Italy, in France and the UK a number of larger enterprises emerged and this can be because of increased competition. In already highly consolidated Member States, such as the Netherlands, the number of enterprises increased and simultaneously the milk intake per enterprise decreased.

The findings confirm an increase in competition in several Member States, but it is difficult to draw any conclusion whether this is caused by the 2003 CAP Reform for milk and milk products, or whether it is the result of a more progressive structural change. The interviewed processors did not confirm any direct effect of the 2003 CAP reform on the structural development of their companies. However, it should be noted that this result is based on a small, non-representative sample and hence cannot be considered as an absolute statement. Moreover, structural change is a long-term process, implying that it might not have been easy to link changes taking place in the industry in the observation period to changes in policies or other factors. This might particularly hold for the EU-10 and EU-02, which when entering the EU started to experience a general transition process, which still might not have stopped.

Summary of findings for each indicator, EQ7

Indicator	Expected result	Evidence found
Overview of the EU dairy processing sector - Identification of structural change		
Evolution of the EU dairy processing sector per Member State	Decline in the number of processing firms due to continuing consolidation process	The number of dairy enterprises declined in 11 Member States (for 8 Member States the information is incomplete). If so, the size of the remaining enterprises were larger and processed more milk.
Market share of the EU dairy firms worldwide	Concentration can lead to a few large processing firms coexisting alongside relatively large number of small specialist dairy product processors	European dairy firms are listed among the biggest dairy firms worldwide and are located in France, the Netherlands, Denmark/Sweden, Germany and Italy. They still coexist with relatively smaller processors, but merging of companies lead to fewer firms which process more milk (e.g. in Italy, France and the UK)
Concentration ratio of the biggest dairy firms per Member State	Concentration is expected to increase as a response to more intense competition	For 4 Member States(Spain, Austria, Italy, Latvia) calculated multi-annual concentration ratios increased , suggest a restructuring process towards larger milk processing companies.
Linkage of structural changes with CAP reform		
Answers of interviewed processing companies	Signals that competition has increased and that specific policy measures have had an effect on structural change in specific cases (for example butter processing firms being negatively affected by the abolition of domestic consumption aid on butter)	The interviewed processors did not confirm any direct effect of the 2003 CAP reform on the structural development of their companies. Incidentally specific measures were mentioned but given the small sample size conclusion can be drawn.

12 EQ8: Competitiveness on international markets

To what extent have the CAP measures applicable to the dairy sector contributed to improved competitiveness of milk products on international markets?

12.1 Interpretation and comprehension of the key terms of the EQ8

The keyword in EQ8 is competitiveness of EU dairy products on the international market. Whereas competitiveness in general is a broad concept, the evaluation question targets on one aspect of it, namely competitiveness of the EU dairy products on international markets. Since the EU is a net exporter of dairy products, competitiveness is here linked to the potential of the EU to profitably export dairy products to the world market, without being in need of any kind of support. Competitiveness is also linked to being able to preserve or expand its position in the market.

Competitiveness is understood both in terms of quantities and of prices. As was shown in Chapter 4, both are closely related to each other (see in particular Section 4.3). Being competitive with respect to prices means selling in this price, which will enable to supply larger volumes. Furthermore, if a product loses market share this is often related to non-competitive prices, in particular when products in the market are homogeneous or standardised. An indicator of competitiveness is the evolution of the market shares of the EU dairy products in the world markets. In particular when products are highly differentiated (e.g. different types of cheese) it can be the case that in spite of a negative price gap, still a certain volume of products can be exported without any subsidy. As such the evolution of unsubsidised exports is of interest.

A further point to consider is the gap between EU prices for dairy products and the associated world market prices (price-competitiveness). As discussed in Chapter 3, there is a link between the competitiveness of EU dairy products and the CAP measures aiming in stabilising prices e.g. intervention prices for butter and SMP, export refunds, the buying-in rate of intervention for butter and skim milk powder, and to a much lesser extent certain disposal aids for intermediate and final consumption of dairy products (see Chapter 9).

Another aspect of competitiveness is the degree of protection at the home market which is determined by the level of import duties (e.g. import tariffs, tariff rate quotas). The trade policies as such did not change after 2003, while the levels of the import duties have been only slightly adjusted (see Table 14.8). Therefore import tariffs and tariff rate quotas affected only slightly changes of the EU's competitiveness of milk products in international markets and are not the focal point of this Chapter.

It is important to note that competitiveness is related to longer term trends and not to incidental situations. As such it is important not to draw strong conclusions from market disruptions, which may have a large impact on the market and also on the export possibilities, but which have to be separated from longer run structural changes happening in the dairy markets.

The milk products concerned in this question are butter, SMP, WMP and cheese. As shown in EQ6, the extra-EU trade of drinking milk and cream is very limited and for those products rather the domestic market and not the international is of interest. Hence, competitiveness on international market is not relevant for cream and drinking milk.

12.2 Methodology used for answering the EQ8

Per product the evolution of the EU's market share with respect to exports and imports is evaluated, and linked to policy measures. Since exports and imports are part of the market balance, this evaluation questions is linked to EQ6.

The following steps have been made in order to derive the characteristics of the EU's dairy exporters' competitiveness:

- The market share of the EU in world trade for the above mentioned dairy products is assessed and related to policy measures;
- The evolution of unsubsidised exports and its share in EU's total exports is discussed
- The evolution of the price-gap between EU and world market prices for dairy products is analysed and linked to policy measures;
- Within the case study areas, dairy processing firms have been asked how they perceive EU policy measures and changes therein to have affected their competitiveness. The information this delivered with respect to competitiveness is used in this chapter.

Regarding the own survey, dairy processors were asked questions on how they perceived their competitiveness in the international and home market. Questionnaires were answered by 42 processors in 10 Member States. The processors were asked to what extent they see a link between changes in competitiveness and the EU CAP policy measures which have been implemented since 2003 and have been part of the 2003-reform. Also local stakeholders and experts were approached in order to get complementary information on the processing sector in the case study countries. However, because of the small sample and potential biases in answers to questions, the results are not representative. Moreover, it also cannot be excluded that firms behave in a strategic manner and disclose information in a selective way. Results based on this information should be treated carefully (see also Section 11.2.2 for more details).

12.3 Judgement criteria, indicators and information sources used for each indicator

Table 12.1 summarises the indicators and information sources that have been used to evaluate EQ8.

Table 12.1 Indicators, data requirements and information sources for EQ8

Indicator	Data requirement	Information sources
Share of EU in world trade of milk products by product	Imports and exports of milk products	Imports and exports of milk products (EQ6)
Share of unsubsidised exports in total EU exports by milk product	Volume of exports of dairy products without export refunds	DG AGRI
Price-gap between EU and world market prices for milk products (butter, cheese, SMP, WMP)	EU and world market price series for milk products; Bound and applied tariffs for milk products (export refunds and import duties)	DG AGRI, EUROSTAT
Number of product innovations	Information on product innovations Information from questionnaire to processor on value added production, competitiveness, impact of policy measures on competitiveness	Processors survey (in case study regions)

The EU's dairy industry is evaluated to be competitive or becoming more competitive, if:

- The share of the EU in world dairy product trade increased (without the use of refunds)
- The share of unsubsidised exports over the total exports was positive and/or increased
- The price difference between EU and the world market declined
- The imports of milk products into the EU from abroad decline relative to the domestic supply (import substitution).

Moreover, based on information from the survey to processors, a qualitative assessment has been made as to how:

- EU policy measures and changes therein affected the competitiveness of the dairy industry, with specific attention for how different milk products may have been differently affected
- The (state) aid provisions contributed to improving the competitiveness of the dairy industry.

The reader should be warned that changes of the EU's market share could also be due to the declining fat and protein excess supply in the EU (see EQ1a and EQ6). The latter is a result of the still increasing home demand in the EU for protein relative to the supply. The EU's share in raw milk production declined from 25.8% in 2000 to 21.6% in 2009 (e.g. Figure 2.2), with the milk quota being the main factor explaining the limited growth of the EU's milk supply. In the same period the domestic demand (measured in terms of milk equivalent) increased by about 16% (1.7% per annum).

A further limitation of the market-share indicator for measuring competitiveness is that as long as production quotas limit overall milk supply, then maximising sales worldwide (i.e. market share) is not the main objective but instead the world market is a residual market for what is produced and cannot be absorbed internally. How much is exported depends in this case more on the supply side than on the demand side. Furthermore, it is the world market share of unsubsidised exports that counts – not total exports. Finally, if the total of the world market trade is growing fast, with new exporters and importers coming on the scene, it is inevitable that the EU will lose market share – but it would be premature to conclude from this fact alone that this means loss of competitiveness. There are just simply more competitors.

12.4 Market shares of EU dairy products in export and import markets

12.4.1 Butter

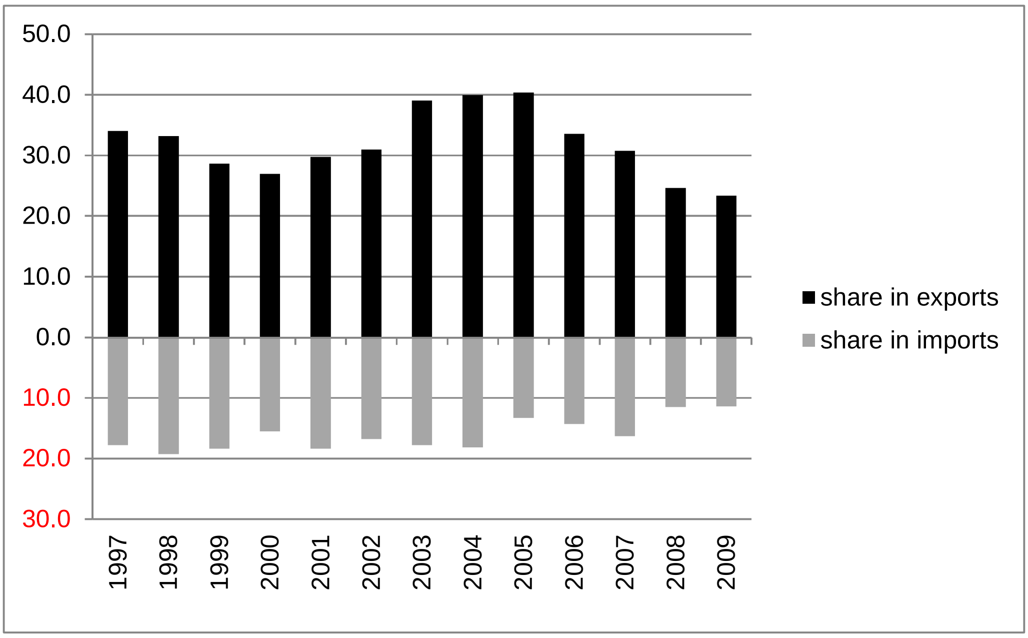
Figure 12.1 shows the evolution of the EU's market share in world butter trade over the period 1997-2009. The EU was a net exporter for butter. In absolute terms and focusing on the longer run trend the EU's market position did not change between 1997 and 2009. From 2000 to 2004 the EU increased its market share in world butter exports and after 2004 this market share declined, suggesting lower market competitiveness. Note also that whereas the subsidised consumption in the EU's domestic market strongly reduced since 2006 (decline being approximately 595 thousand tonnes; see Table 10.2) this did not lead to a spill over in terms of increased exports to the international market in these years. The decline in the EU's total exports after 2004 is linked to the decrease of the subsidised exports. The reduction of the subsidised exports is linked to the CAP 2003 reform and is in turn associated with the reduction of the intervention prices.

The increase of the butter exports from 2000 to 2004 is linked to the need of the EU to export the fat excess supply (with public buying in stocks being relatively high). Until 2006, during a period when almost all exports were subsidised, the EU's market share increased, while the shares of New Zealand and Australia decreased (Table 2.9).

The imports were lower than the exports and showed a declining trend. The EU did not import more in the years when it exported less because of the level of the world market prices and import tariffs.

While the extra-EU trade declined, in the same period the intra EU-trade increased (see Table 2.9), suggesting that the relative competitiveness of the EU butter with respect to provisioning the home market has increased since 2003.

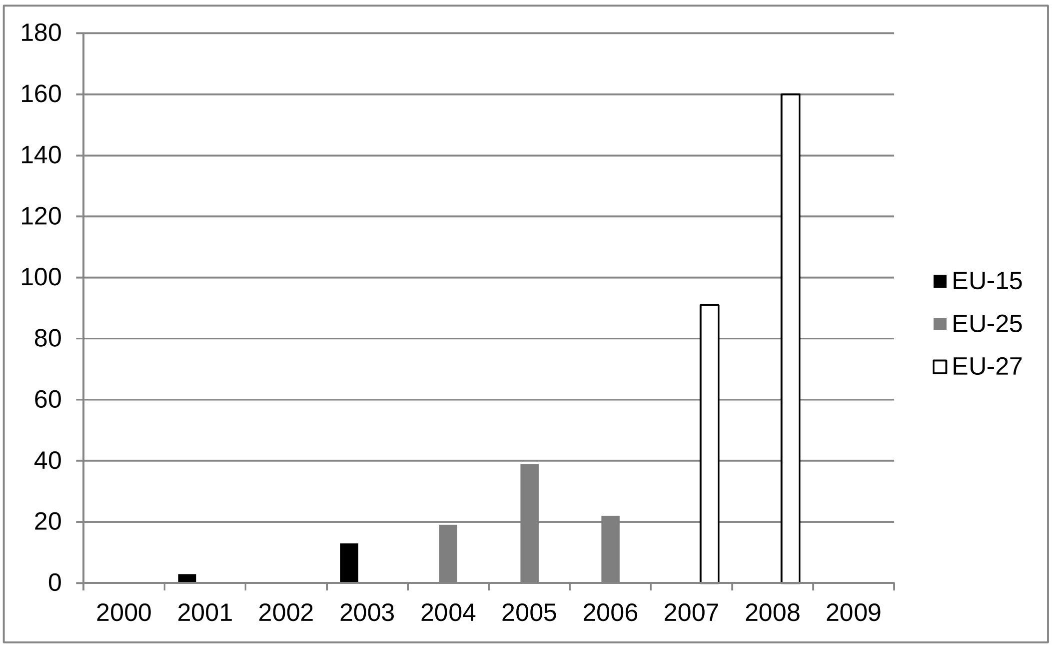
Figure 12.1 EU-27 market share in world butter trade, 1997-2009, in %



Source: own calculations based on COMTRADE.

Figure 12.2 shows the evolution of unsubsidised exports in the EU. Until 2006 unsubsidised exports were relatively small (on average no more than 6% of the total exports) and increased sharply in 2007 and 2008 as a result of the strong increase of world market prices. At the same time the price of vegetable oils peaked (basic ingredient of margarine and other spreads), which positively influenced the relative competitiveness of butter. This made the EU butter temporarily more competitive, both at the international and the domestic market.

Figure 12.2 Unsubsidised exports of butter, EU-27, in 1,000 tonnes



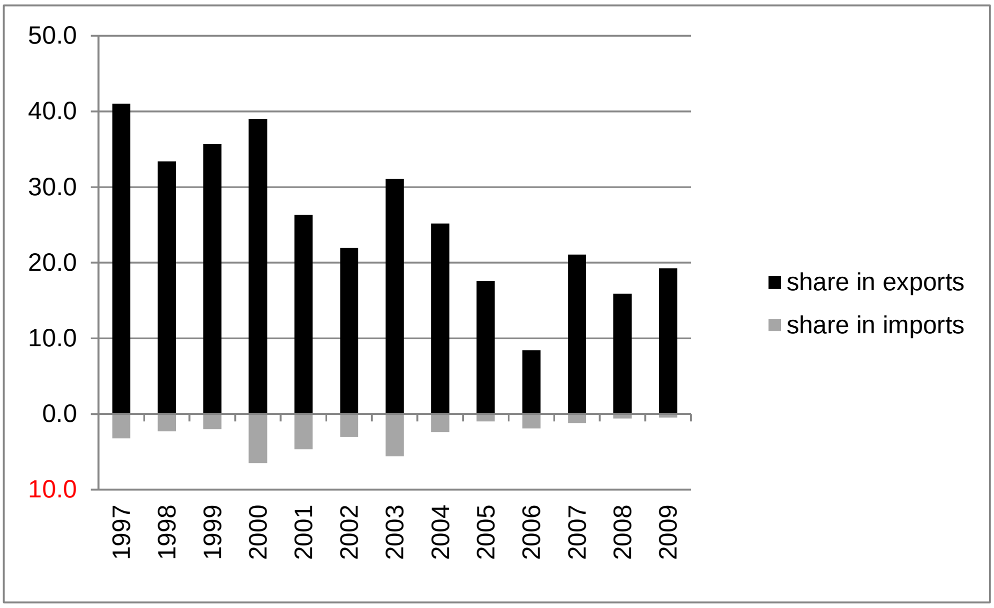
Source: own calculations based on DG AGRI (various years and unpublished).

12.4.2 SMP

Figure 12.3 gives an overview of the evolution of the EU's market share in SMP. Just like for butter the EU is a net exporter and plays a minor role as worldwide importer of SMP. The EU's share in world SMP exports fluctuated more than this of butter and showed a declining trend between 1997 and 2009 suggesting the EU was losing its competitiveness in international trade.

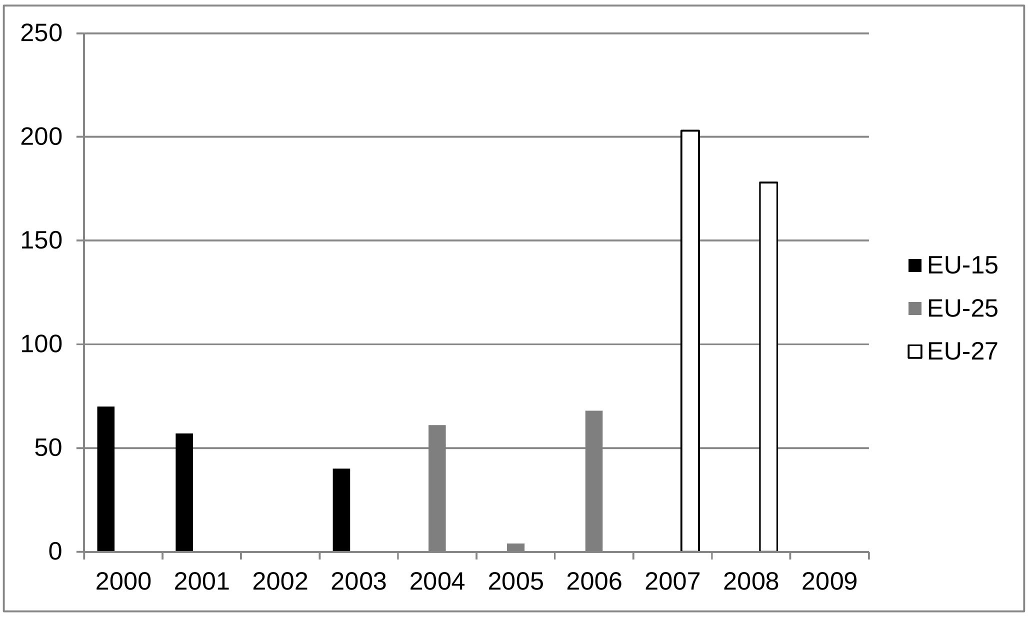
Figure 12.4 shows the evolution of the EU's unsubsidised SMP exports. They fluctuated depending on the relationship between the level of the world market prices compared to the EU WMP price and no clear pattern can be seen especially for the period after 2004. In 2004 about 20% of the EU's total SMP exports were exported without refunds; in 2008 this was about 99%.

Figure 12.3 EU-27 market share in world SMP trade, 1997-2009, in %



Source: own calculations based on COMTRADE.

Figure 12.4 Unsubsidised exports of SMP, EU-27, in 1,000 tonnes



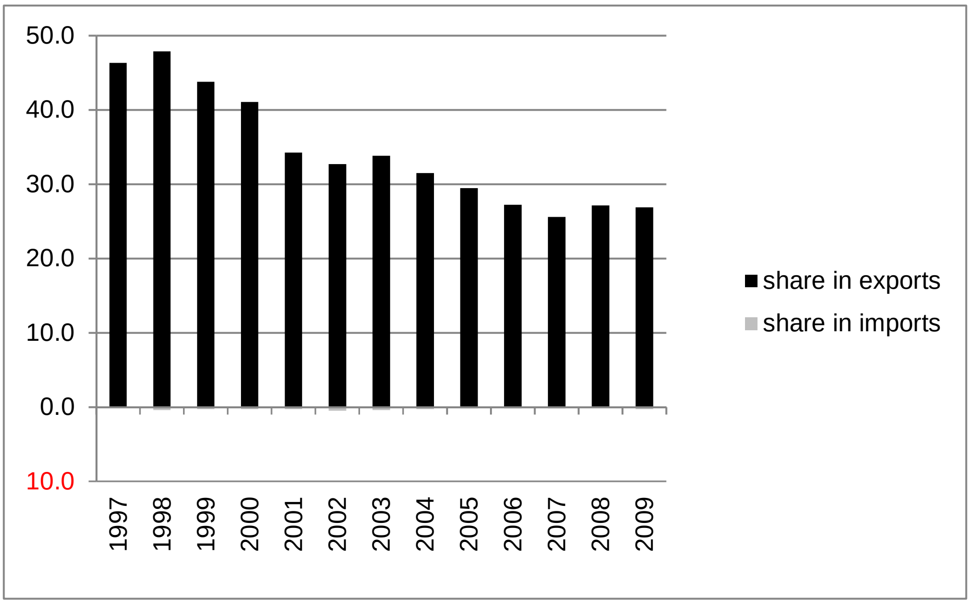
Source: own calculations based on DG AGRI (various years and unpublished).

The subsidised exports fluctuated and were higher in years with low world market prices. Because of the subsidised exports, the level of exports did not drop more in the respective years. After 2004 the level of subsidised exports declined and this is associated with the gradual decline of the SMP intervention price. In those years the EU's export share dropped, apart from 2007. In 2007 the EU prices were almost as high as the world market ones driving upwards the EU exports. In 2008 no export subsidies were given as the prices were still high. In 2009 there was no drop in exports because export subsidies were reactivated. In overall, the decline of export subsidies led to decline of the EU's share in world SMP exports.

12.4.3 WMP

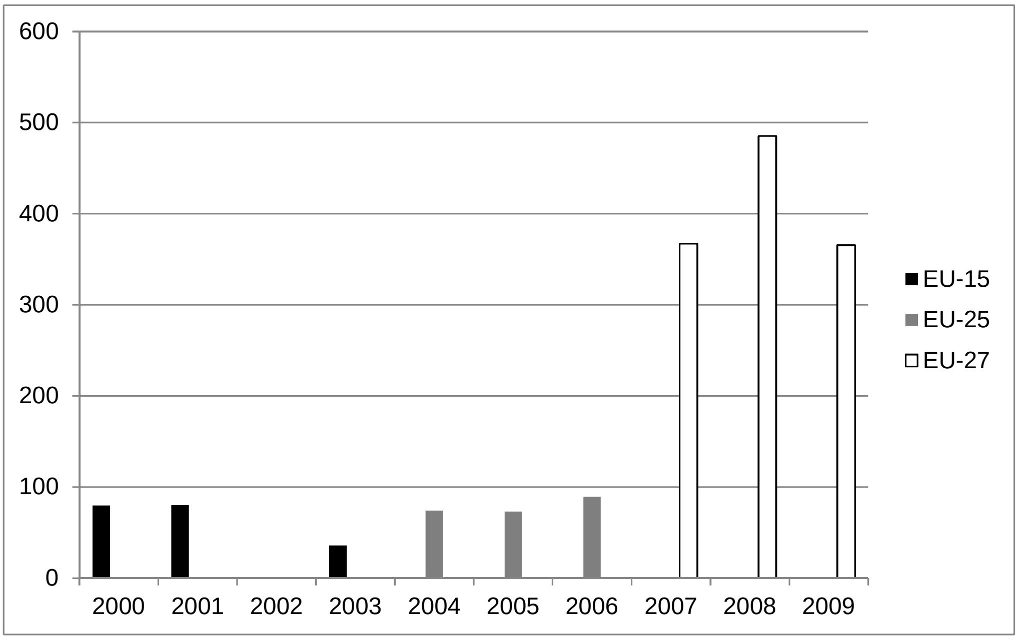
The EU is a net exporter of WMP, but its export share declined gradually between 2000 and 2009. Only in 2003 the export share slightly increased (see Figure 12.5). As with butter and SMP exports, the role of the subsidised exports is important, (see also Table 10.4). The exports declined because of decline in subsidised exports. Imports were virtually non-existent.

Figure 12.5 EU-27 market share in world WMP trade, 1997-2009, in %



Source: own calculations based on COMTRADE.

Figure 12.6 Unsubsidised WMP exports, EU-27, in 1000 tonnes



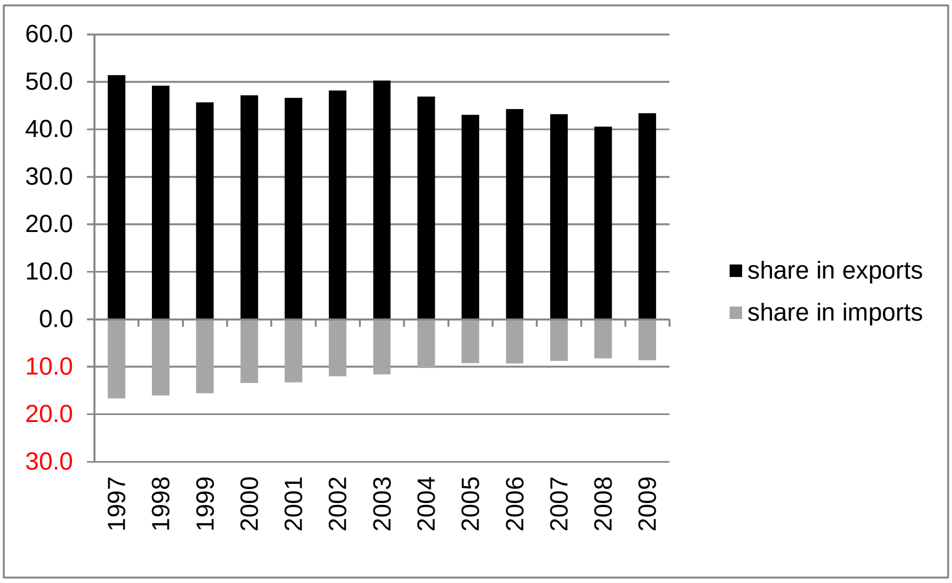
Source: own calculations based on DG AGRI (various years and unpublished).

As Figure 12.6 shows, part of the EU's WMP exports is unsubsidised. In the period 2000-2006, this accounted 17% of the EU's total annual WMP exports. In the recent years (2007-2009) with the market imbalances and high world market prices, the EU's price-competitiveness temporarily improved. In 2008 and 2009 all of the EU's WMP exports were unsubsidised.

12.4.4 Cheese

The EU is a net exporter of cheese. It used to be the world's biggest exporter until 2004 but lost the first position ever since and was overtaken by New Zealand. After 2004 the declining trend of the cheese exports was stronger than before (see Figure 12.7). The reduction of export subsidies was not as high as for the other commodities, and hence the declining trend was also not as high as for butter, SMP or WMP.

Figure 12.7 EU-27 market share in world cheese trade, 1997-2009, in %



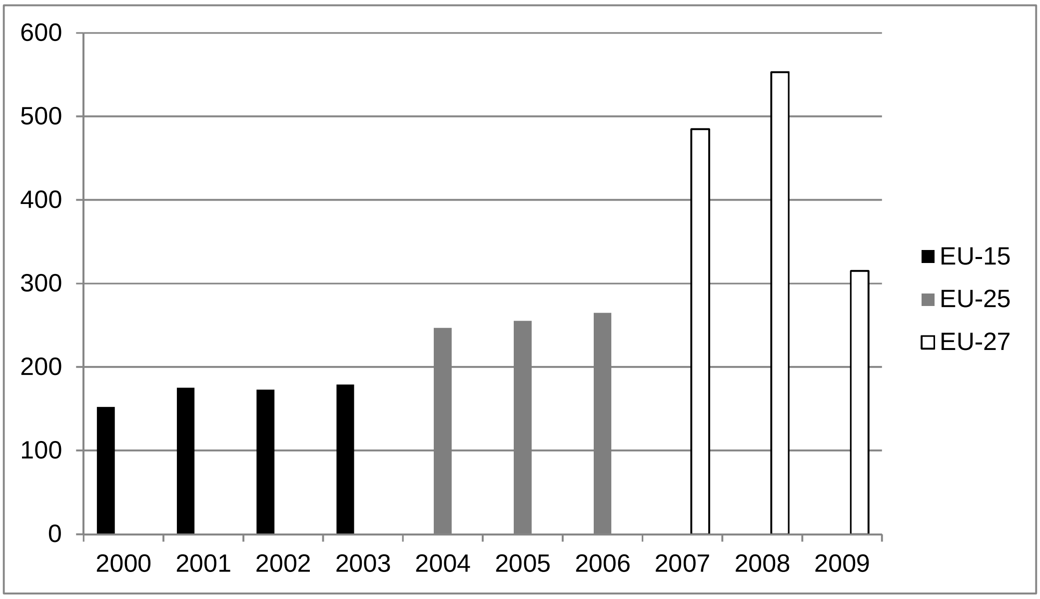
Source: own calculations based on COMTRADE.

The EU's share in world imports nearly halved since 1997. During this period the intra EU-trade increased suggesting that the relative competitiveness of the EU's cheese processing sector increased in terms of provisioning the domestic market.

As Figure 12.8 shows, the EU exported consistently a significant amount of cheese to the world market without any subsidies. These exports concern traditionally high value cheeses, with a niche-product character (e.g. PDO cheese). In the period 2000-2006 about 40% of the cheese exports were unsubsidised. As the figure shows, unsubsidised exports show a steadily increasing trend.

From the case studies carried out in Italy (provinces of Emilia Romagna and Lombardy), France (Franché Comté) and Austria, the special position of PDO cheeses was highlighted (e.g. Grana Padano, Parmigiano Reggiano, Comté) as an explanatory factor for this development. As an important example, the exports of the Italian Grana Padano and Parmigiano Reggiano PDO cheeses to countries outside the EU increased from 32,804 tonnes in 2000 to 68,769 tonnes in 2010 (increase by 60%). The exports of Italy of these cheeses to countries outside the EU surpassed the exports to EU Member States by about 65%. Large parts of these exports were unsubsidised. These special quality products not only receive a price premium, but the evolution of PDO cheese prices turns out to be not very dependent on the evolution of international prices for butter and skimmed milk powder, indicating a relatively low competitive pressure from competing products.

Figure 12.8 Unsubsidised cheese exports, EU-27, in 1000 tonnes



Source: own calculations based on DG AGRI (various years and unpublished).

12.5 Prices for dairy products

The evolution of the EU's producer prices for main dairy products as well as the respective world market prices and the intervention prices for butter and SMP in the EU have been extensively analysed when answering EQ5. Here the focus is be on the main trends of the gap between the EU and the world market price and not on the price stability impact of the CAP measures.

12.5.1 Butter

The EU price is in general much higher than the world market price (in the period 1997-2004 on average by about a factor of 2). Since 2004 the EU and world market prices started to converge and part of this is because of the reduction of the intervention price. In this respect the 2003 CAP reform contributed positively in increasing the EU's competitiveness on international markets.

12.5.2 SMP

Until 2004 the EU price of SMP was kept above the world market price whereas the intervention price acted as a price floor for the EU prices. From 2004 and onward the SMP intervention price gradually decreased allowing to narrow the gap between the EU and the world market price. As for butter the change in the intervention price was positive for boosting the EU's competitiveness in world markets.

12.5.3 WMP

As was already noted before (see answer to EQ5, Section 9.4.3), the market price of WMP is strongly related to SMP and to butter prices. While there is no intervention price for WMP, the intervention prices for butter and SMP indirectly affect the formation of the EU WMP producer price. Also the gradual increase of the WMP price in the world market since 2003 is similar to the changes for butter and SMP. This also holds for the linkage between converging prices and changing EU policies and the effects of the 2003 CAP reform on the competitiveness of the European WMP.

12.5.4 Cheese

As became clear from the price analysis in the answer to EQ5,the EU market price for cheddar cheese moved similarly as the prices of butter, SMP and WMP and as well a gradual convergence between the EU and the world market price is observed since 2003.

However the prices of high value added cheese types moved without being highly affected by developments in world dairy markets and the changes in the CAP intervention measures. These cheese types earn a price premium, which signals they have a desired special quality which allows these products to be in the market, even when cheaper substitute cheeses are also available. The own survey confirmed this observation. For example in Austria firms successfully expanded the production of speciality cheese, which found their way to far outside the EU, often without needing any support.

12.6 Other issues on competitiveness

12.6.1 Perceptions on policy changes and competitiveness by the dairy industry

Looking closer to the impact of the CAP policy measures on the competitiveness of the dairy industries, the interviewed dairy processors were asked if the policy measures impacted positively or negatively or had no clear impact on their competitiveness on national and on international markets. Table 12.2 summarises their responses.

Table 12.2 Impact of CAP policy measures to the dairies competitiveness on national and international markets (frequency of answers given in survey)

	National market			International markets		
	Positive Impact	**No Impact**	**Negative Impact**	**Positive Impact**	**No Impact**	**Negative Impact**
Milk quota	X	XX			X	
Public intervention	X	XX			X	
Private storage aid	X	XX			X	
Aids in the milk and milk product sector		XX			X	
Butter, concentrated butter and cream disposal scheme		XX			XX	
Welfare milk scheme		XXX			XX	
National aids in the milk product sector		XX			XX	
Tariff rate quotas		XX			X	
Import duties		XX			X	
State aids	X	XX		X	X	
Rural development programmes	X	XX		X	X	
School milk programme		XX			XX	
Export refunds	X	XX		XX	X	

Notes: X = 20 or more respondents gave this answer; XX = 30 or more respondents gave this answer; blank = less than 20 respondents gave this answer

Source: own survey.

In general the respondents found it often difficult to indicate a clear link between the changes in the policy measures and their competitiveness. This is because several interviewed processors felt that the day-to-day issues on competitiveness relate more to actions of other competing suppliers and of the retailers. In fact they often stated that they considered the impacts of changes in CAP policy measures to be indirect. Moreover, they referred to similar measures as being important for their competitiveness on the home market as well as on the international market. This suggests that they are aware of the interaction effects between developments affecting national and international markets.

As regards the milk quota, some processors argued that it contributed to preserving the resource base (supply of raw milk by farmers), which could have not been the case if the quota would not have kept the milk in the region by a constraint. Processors who gave this answer also had a tendency to refer to the importance of direct payments and aids to keep milk production profitable in areas where there are severe natural handicaps. Private storage aid was thought as helping to benefit from better market opportunities. However, they said that the change in the milk quotas and market intervention (which are subject to this evaluation) did not cause any additional effect on their competitiveness.

With respect to the competitive position on export markets, the respondents frequently mentioned the importance of export subsidies as a necessity in order to be able to export. As such this answer indicates that these respondents acknowledge that they are not competitive without them. Respondents leading firms focusing on the production of speciality cheese did not refer to this argument, and confirmed that product differentiation could be a successful alternative for coping with pressure from competition.

The importance of state aids was mentioned to be an important factor for smaller and medium sized dairies as contributing to the modernisation of their business. Measures stimulating domestic demand were mentioned as a factor positively influencing competitiveness: the additional demand created better marketing possibilities.

12.7 Marketing strategies for dairies

There are different strategies dairy companies can follow in order to adapt to new policy and/or market conditions. Five strategic types of innovation for strengthening the competitiveness of the dairy industry, listed in the Oslo Manual (OECD, 2005) are product innovation, process innovation, marketing innovation, organisational innovation, and the conquest of a new source of supply of raw materials or semi-manufactured goods. From the case studies it appeared that a number of Austrian processors recently developed a new product (whey milk) in order to improve their competitive position. There are signals from the own survey among processors that, with the intervention mechanism being transformed into a safeguard provision, they were stimulated to orient themselves in another direction (Table 12.3).

Table 12.3 Innovations in the dairy sector for selected Member States in 2009

	France	Germany	Hungary	Italy	Nether lands	Spain	UK	Total
Cheese	218	202	71	350	34	13	43	931
Creamers	11	17	18	18	2	0	12	78
Dairy alternative drinks	11	3	4	20	21	5	13	77
Dairy drinks	24	96	30	69	31	24	43	317
Other dairy products	1	7	2	3	0	0	0	13
Yoghurt	89	176	30	77	18	24	84	498
Total	354	501	155	537	106	66	195	191 4

Source: Bunte *et al*. (2011, p.93).

As an example the reduced attractiveness of intervention stimulated processors in Ireland to invest more actively in switching to cheese production. In a recent study the number of new products introduced in 2009 was given for seven selected EU Member States. In these 7 Member States 1,914 innovations were denoted in one year (approximately 35 per week). Table 12.3 also shows that most innovations took place in cheese products, followed by fresh dairy products (yogurt) and dairy drinks. The focus to try to innovate in these areas is confirmed by the case studies. According to Bunte *et al*. (2011), in general the number of product innovations has increased since 2005, in dairy as in other sectors (exceptions for the dairy sector are Spain and the UK).

Tacken *et al*. (2009) showed that product innovation is the most important strategy for dairy companies. The main focus is on searching for new varieties of products and introducing new ingredients that represent new functionalities of the product. The authors suggest that dairy companies more often pursue a defensive or analytical strategy than a prospective strategy.

The next most frequent type of innovation is marketing innovation. This kind of innovation is distinguished by its focus on reaching new groups of consumers by promotion activities, addressing special target groups and approaching new markets.

Setting up organizational innovation is the third important topic. By this is meant the possibility to benefit from cooperation, patenting, licensing and changing the market position.

Processing innovation comes as the fourth most important strategy. Innovating companies improve their way of production or the production equipment. i.e. through improvements in technology. Tacken *et al*. (2009) showed that this type of innovation positively affected labour productivity in particular.

Creating a ranking based on the number of innovations reported in the Innovation database, Arla ranks in order of innovative output (from high to low) Danone, Dairy Crest, Campina, and Nestle. EU based firms also ranked higher relative to key foreign dairy processors (e.g. Fonterra).

12.8 Conclusions

Competitiveness is linked both to quantities (supply, export and import volumes) as a prices (measured by the distance between EU prices and world market prices).

The market share indicators show that the EU lost market share for SMP WMP, butter and cheese in the period 2003-2006. In the preceding period (1997-2003) market shares for SMP and WMP declined, but those for butter and cheese remained both more or less stable. In the period 2007-2009 export shares remained stable (cheese) or increased (SMP, WMP), while for butter the market share continued to gradually decline. The loss in market share may suggest a reduction in the EU's competitiveness during the evaluation period, as well as during the period before 2003. In interpreting this result it should be noted however that the EU's share in world raw milk production declined from 25.8% in 2000 to 21.6% in 2009. Note that also the exports of dairy products (in milk equivalents) as a percentage of EU domestic supply declined over the period 2003-2006. When evaluating the period 2000-2009 there is no clear trend in share of EU exports of dairy products in total milk supply.

For most of the years between 2000 and 2009 the milk quota have been the main factor limiting the EU's supply growth of the raw milk. In the same period the domestic demand for dairy products (measured in terms of milk equivalent) increased by about 16% (1.7% p.a.). Thus the evolution of the EU's export market shares are co-determined by these developments within the EU. As such indicators expressing the EU's export share in total world exports for dairy products have a limitation to measure changes in competitiveness. A potential sharp growth in the world market and a continuous increase in the EU's domestic consumption of dairy products can both lead to a decline in the EU's export share, without reflecting a structural loss in competitiveness.

Export subsidies for butter SMP, WMP, cheese declined since 2003. After 2006 the increasing demand for EU milk fat absorbed the excess supply (see also the discussion on the structural excess supply of fat in Section 5.5). The increased demand for fat came from several directions: world market prices for fat containing dairy products (e.g. butter, cheese, WMP) increased triggering EU (unsubsidised) exports in these products. The simultaneous high increase in vegetable oil prices in the period 2006-2008, also improved the relative competitive position of butter with respect to products based on vegetable oils (margarine and other spreads) in international and domestic markets. Since these developments were strongly driven by external factors there is no indication of a structural increase in competitiveness on the world market.

The above analysis showed that until 2004 the EU markets for processed dairy products have been affected more by the policies applied to the dairy sector (intervention prices, and in particular their decrease, and adjustments in export subsidies) than by developments in international markets. This is related to the often large price–gap between EU and world market prices, which in turn followed from the high intervention prices in the EU relative to world market price levels. In such a situation the EU is generally not competitive with respect to external markets since exports refunds are necessary for being able to export and compete with foreign suppliers (a notable exception are differentiated cheese products). This result was confirmed by the processors responding to the survey, who also pointed to the importance of export refunds.

Since the 2003 CAP reform there is a clear linkage between the observed convergence between the EU and the world market prices for dairy products and the reduction of the intervention prices for butter and SMP and the increasing prices at the world markets. Both the intervention price decline and the world market price increase have been equally important in reducing the price gap. This has as such improved the relative price-competitive position of the sector: lower support amounts per unit of product are needed to bridge the gap with the world market and export products; world market prices may more frequently surpass EU prices and when so, the EU can export products. However, since in an absolute sense prices for dairy products in the EU were still structurally above the world market level, the EU was not competitive (being able to export without subsidies) for most dairy products (exceptions are niche dairy products). The picture changed between 2007 and 2009: then developments at international markets affected the EU's domestic market and because of the high prices worldwide, the EU increased its unsubsidised exports substantially.

As regards the indicator on the volume of unsubsidised exports, unsubsidised cheese exports increased over the period 2000-2009, with 2007 and 2008 being exceptional years with very high unsubsidised cheese exports. From the case study analyses (Italy, France, Austria) it was highlighted that exports of PDO cheeses to outside the EU increased significantly (for example exports of two main Italian PDO cheeses increased by 60% in the period 2000-2010). These high value, high quality products are not very sensitive to competition from other dairy products due to their uniqueness and speciality character. The unsubsidized exports of butter, SMP, and WMP had a more incidental character and lacked a clear structural trend.

The share imports for butter, SMP and cheese in total world imports show a tendency to decline over the period 2003-2009. For WMP this share has been close to zero for the whole period 1997-2009.

Summary of findings for each indicator, EQ8

Indicator	Expected result	Evidence found
Share of EU in world trade of milk products by product	Evidence sought: counteracting effects expected from declining price gap and growing world demand	The EU lost market share for SMP WMP, butter and cheese, in the period 2003-2006. In the preceding period (1997-2003) market shares for SMP and WMP also declined, but those for butter and cheese remained both more or less stable. In the period 2007-2009 export shares remained stable (cheese) or increased (SMP, WMP), while for butter the market share continued to gradually decline
Share of unsubsidised exports in total EU exports by milk product	Expected increase for special cheeses, but not for other dairy products	The volume of unsubsidised cheese exports showed a steady increase over the period 2000-2009, with 2007 and 2008 being exceptional years with very high unsubsidised cheese exports. From the case study analyses (Italy, France, Austria) the role of PDO cheese was highlighted.

Indicator	Expected result	Evidence found
Price-gap between EU and world market prices for milk products (butter, cheese, SMP, WMP)	Price gap was expected to decline due to the decline in EU intervention prices, adjustments in export refunds, and increasing world demand	Since the 2003 CAP reform a strong convergence of EU and the world market prices for dairy products has been observed, which was partly due to the reduction of the intervention prices for butter and SMP and partly to the increasing prices at the world market. With the market disturbance of 2007 the price gap became even negative.
Number of product innovations	An increase expected as a response to mitigate the increasing competitive pressure	There is some evidence that the number of innovations has increased since 2005

13 EQ9: Efficiency

To what extent have the CAP measures applied to the dairy sector been efficient with respect to achieving their objectives?

Have the 2003 CAP reform contributed to achieving a simplified and effective administration and management of the measures applied to the sector?

13.1 Interpretation and comprehension of the key terms of EQ9

The objectives covered in this evaluation question are introduced and linked to their relevant legislative sources in the Intervention Logic for this evaluation. They are: market balance and market stability, the income of milk producers, the competitiveness and market orientation of the dairy sector, production structures and structural change, and the simplification of dairy policy and its administration. Maintaining or increasing consumption of dairy products was cited several times in the 1999 and 2003 legislation as a policy aim, but has not been referred to in legislation since then. We have opted to interpret consumption of dairy products as an aspect of the overall objective of improving market balance and not as a final objective in its own right. This interpretation is more compatible with the strong emphasis in the rest of the dairy legislation on market orientation, and with the general principle underlying EU food policy of informed consumer choice and consumer sovereignty. Therefore, consumption levels and trends will be considered relevant only in so far as they relate to market balance. Finally, several other objectives were mentioned, namely environmental aspects and product quality, which will be referred to in appropriate places, but will not be systematically taken into account.

Efficiency is defined as "The extent to which the desired effects are achieved at a reasonable cost. The Financial Regulation (article 27(2)) defines efficiency as the best relationship between resources employed and results achieved."[79] Guidance notes on this methodology from DG AGRI (2006) add that efficiency concerns whether a greater impact "could have been obtained with the same budget or whether the same effects could have been obtained at a lower cost" and suggests that "An indicator of efficiency is calculated by dividing the budgetary inputs mobilised by the quantity of effects obtained".[80] We therefore interpret the criterion 'reasonable cost' to refer to *budget* (i.e. taxpayer) *cost*.

Although these definitions leave no doubt that, on a conceptual level, evaluating efficiency requires comparing the achievement of impacts to the budgetary cost of achieving them, the practical implementation of the concept poses several problems in the context of this evaluation. First, none of the objectives of dairy policy during the evaluation period have been assigned a specific target, and even less a quantified target. Budget costs, on the other hand, are quantifiable. In asking about the cost-efficiency of particular measures in achieving their objectives, the evaluation question either assumes a priori that objectives *must* have been met in full, or expects that it is possible a posteriori to quantify the extent to which they have been met. By contrast, given the absence of quantifiable final targets, we can only assess whether the policy has moved the sector or the outcome in the direction indicated by the objective, or whether no effect can be discerned. Where an improvement going in the desired direction is found, however, it is not necessarily possible to say whether a target has actually been reached and the objective has been fully achieved, or whether only a part of what could have been achieved (or was hoped to be achieved) has occurred. In the case of partial fulfilment only, it is inevitable that this must have implications for the efficiency judgment. What is clear from the above is that it is generally not possible to draw conclusions of the kind: "Objective A was fully reached at a budget cost of €B million", or that "Each additional €Z million of budget expenditure on export refunds per annum brought the sector Y% closer to achieving the desired market balance".

[79] "Evaluating EU Activities: A Practical Guide for the Commission Services" (European Commission, 2004, p.104).

[80] "Handbook on Common Monitoring and Evaluation Framework Guidance Document" (DG AGRI, 2006) Glossary (p.4).

Second, the answers to evaluation questions 1-8 have already stressed that the second part of the evaluation period (from roughly end-2006 onwards) was marked by strong turbulence on world dairy product markets and world commodity markets generally, from which EU markets were not spared. The severe failure of the 'ceteris paribus' conditions under which an indicator-based evaluation would ideally be conducted brings two related difficulties. First, there is the challenge of separating out the effects of the policy changes from the changes driven by unusual exogenous factors that were large enough to mask those achieved by policies. This issue has already arisen when answering the first eight evaluation questions. Second - and this issue arises for the first time here and in the following evaluation questions - there is the problem of how to judge the policies themselves. From the vantage point of 2003, or even early 2006, there was little indication of the turbulence to come, and as a consequence policies were not designed to be 'turbulence-proof'. However, it is possible that policies which would have been appropriate for attaining sectoral objectives at reasonable cost in a turbulence-free context are less so in a more turbulent world market context. When background conditions change dramatically, the evaluation task faces the dilemma of whether to evaluate policies on the assumption that the expected exogenous conditions that were those that prevailed (which requires some kind of counterfactual) or whether, using the wisdom of hindsight, to assume that the policies should have been *more* 'turbulence-proof', and therefore to evaluate them in the high-turbulence conditions that actually occurred. This evaluation does attempt to choose between these options on a general level. In one case (see section 13.4.4), calculations that attempt to remove the impact of the world market price surge in 2007-2008 on producer support are used as a basis for the argumentation. Otherwise, we stay close to the evidence on actual outcomes, whilst nevertheless trying to separate out policy impacts from the impacts of changing exogenous conditions. No judgement is offered or implied regarding whether policy makers *should* have foreseen the market disruptions of the 2007-2008 and anticipated them.

A third difficulty arises because of the multiplicity of inter-related objectives and instruments that comprise the policy package to be evaluated. The complexity of these inter-relationships was already exposed in the intervention logic. In most cases, where several instruments serve several goals simultaneously, they are mutually reinforcing, in such as way that it is impossible to relate expenditure on one instrument (say, export refunds) solely and exclusively to the achievement of one objective (say, income support). An example of this complexity involves the link between instruments and competitiveness. Not only is 'competitiveness' a multi-dimensional concept but a number of instruments contribute potentially – and indirectly - to its improvement. For these reasons, the efficiency of achieving the competitiveness objective is not directly assessed.

The way these three difficulties are handled when constructing and interpreting the indicators is explained in Section 13.2 (Methodology).

Fourth, the first definition of efficiency quoted above refers simply to 'cost', which as already stated will be interpreted as meaning 'budget cost'. However, in the present context, this definition could lead to misleading conclusions. In a policy evaluation of this kind, various definitions of cost *could* be considered. The widest definition is that of social cost (this would be the relevant definition in a full cost-benefit analysis), while the narrowest definition would focus on the costs incurred by just one of the interested parties (e.g. budget cost, or private cost to farmers). The particular relevance of the choice between definitions of 'cost' in this evaluation is discussed in the following paragraphs.

Table 13.1 sets out several alternative cost definitions. The concept of the PSE (total transfers from consumers and taxpayers to producers) is clearly the broadest definition, even if it leaves out a number of the items that would be included under 'full social cost' in a cost-benefit analysis. The PSE includes the full cost to domestic consumers of paying the higher domestic prices for what they consume[81] rather than just counting the budget cost of all the measures, such as export refunds and consumption aids, that maintain (inside a high tariff wall) the price gap between domestic and world market prices. This consumer cost is typically far greater than the budget cost of the measures for maintaining the price gap, because the higher prices are paid for all dairy products consumed, whereas the instruments maintaining the price gap merely operate at the margin and affect a relatively small number of units.

Moving from left to right in Table 13.1, the definitions of cost become increasingly narrow and specific, and less comprehensive.

[81] Which is passed to the producing sector, but which may not all reach milk producers if price transmission back up the supply chain is weak.

Table 13.1 Various definitions of policy cost

	Definition 1 **Dairy PSE (Producer support estimate)**	**Definition 2** **Cost to the EU and MS budgets of measures originating from dairy policy**	**Definition 3** **Cost to the EU and MS budgets of dairy policies**
Interpretation	Cost to consumers and taxpayers of transfers to producers due to dairy policies	Current cost to the EU budget and MS budgets due to (past or present) decisions relating to the dairy sector	Current cost to the EU budget and MS budgets due to current dairy policies
Items included	Market price support (MPS) (measured as the price gap between domestic and world market milk prices × domestic production, and capturing the net effect of all policies that contribute to creating/maintaining this price gap) + direct payments (payments from EU and MS due to current dairy policy)	Current costs to EU and MS budgets that can be attributed to dairy policies i.e. are currently linked to milk (whether current or past production levels), or to activities specific to milk production ***Plus*** Current budget costs that, for historical reasons, are due to dairy policy and still support milk production but without being explicitly linked to milk or to dairy policy in the current period	Current costs to EU and MS budgets that can be attributed to current dairy policies i.e. are currently linked to milk (whether current or past production levels), or to activities specific to milk production in the current period
What is left out, compared with 'full social cost'	• Policy-related transaction costs • Extra farmer costs due to implementation of the policy (resource costs, administration costs) • Externalities (positive or negative) affecting third parties • Welfare costs for third parties (including extra-EU)	• Extra cost for domestic consumers because of the higher internal prices (but offset by the budget cost under 'dairy policy' of maintaining the price gap) • Any policies not specifically due to dairy policy that contribute to the price-gap (e.g. any SPS or TBT regulations that affect trade flows) ***Plus*** • See previous column	• Current budget costs that, for historical reasons, derive from dairy policy and still support milk production but without being explicitly linked to milk or to dairy policy in the current period ***Plus*** • See previous column

Given the interpretation that 'reasonable cost' refers to 'budget cost', the third definition given in Table 13.1 would normally be the appropriate choice. However, considering only budget costs incurred due to current dairy policy could yield misleading conclusions because of the nature of the policy changes that are the object of this evaluation. Moreover, there are two different reasons why the use of this definition could be misleading.

There are effectively three different dairy support regimes under consideration, which can be characterised rather crudely as "price support" (prior to 2004), "dairy premium" (2004 until the year each Member State decoupled this payment), and "decoupled payment" (after the dairy premium was merged with the SFP).

In all three regimes, the budget cost of market price support measures (trade policies, internal market disposal measures, intervention storage activities) under-estimates the full 'consumer + taxpayer cost' of supporting market price. However, under the first regime, where a larger share of price support is being delivered by market measures than in the other two regimes, the under-representation is greater since the 'hidden' support paid by consumers via the higher price of the product constitutes a greater share of the full cost. In the second regime (lower prices plus dairy premium), part of this consumer-derived support is switched into the direct income payment to milk producers and therefore it becomes 'visible' as an increase in budget expenditure. However, unless the decrease in the consumer contribution to price support, which is part of the switch, is borne in mind, the budget increase could be wrongly interpreted as a net increase in the social (welfare) cost of the policies. Although it is likely that budget expenditure on market intervention is lower in the second regime, because the price gap is lower (smaller refunds) and internal market prices are lower (lower expenditure on consumption aids), this reduction in budget expenditure is still likely to under-represent the fall in the transfer from consumers, which is paid on *all* the intra-marginal units of dairy products, whereas the market intervention expenditure occurs at the margin for relatively small quantities (although the expenditure per unit of this 'marginal' product is higher). Thus, a narrow focus on budget cost alone may well lead to the conclusion that the switch of some support from market price support to a direct payment has increased the economic cost of dairy policy, whereas the opposite is more likely to be true.

A different kind of misrepresentation may occur with the switch from the second regime ("dairy premium") to the third regime ("decoupled payment"). With the decoupling of the dairy premium, this payment to dairy producers loses its identity as a specific *dairy* policy payment. This poses a new problem: if the decoupled payment is removed from the dairy policy cost figures, the impression is given that a significant share of dairy policy expenditure has ceased and therefore the efficiency of dairy policy has increased, even though (a) milk producers continue to receive support at levels comparable with what they received in the second ("dairy premium") regime, (b) the rationale for this payment lies in *past* dairy policy and (c) this support continues to be paid from the EU budget under Pillar 1 in pursuit of one of the objectives of dairy policy.

To deal with the second problem, analysis of this evaluation question will work with two definitions of budget costs, namely the second and third cost definitions given in Table 13.1. The second definition retains the equivalent of the decoupled dairy premium in the estimates of budget expenditure on dairy right up to the end of the evaluation period.[82] This is done in order to provide continuity and to prevent wrong conclusions being drawn about the cost of attaining dairy policy objectives suddenly falling. The methodology for estimating the equivalent decoupled payment (which is called in this text the 'ex-dairy premium') to be included in the measured budget costs is explained in Section 13.2.

It is important to stress that the use of Definition 2 (which includes the ex-DP) in no way constitutes a judgement or even a reservation that the DP may not have been effectively decoupled. The position taken here is that the payment *is* fully decoupled in the way it operates, in the signals and incentives it delivers to milk producers, and in its effects. Moreover, this is the correct way for producers and analysts to perceive it. Keeping it in the figures for dairy budget support until the end of this evaluation period is simply a device to avoid misleading statistical effects. We would expect that in subsequent evaluations, which will not have to contend with a coupled payment specifically for milk becoming decoupled *during* the period of evaluation, this payment will not be treated as part of dairy policy at all. Hence, the use of this definition is a one-off expedient adopted for this evaluation.

The first possibility for misrepresentation (which arises with the shift of some sectoral support out of market price support and into the DP) will not be tackled by using a third 'cost' definition (such as the PSE) that is invariant with respect to the relative shares of consumer and taxpayers transfers in total support to the sector. The main reason for not doing so is that it lies outside the mandated evaluation methodology (which, as explained above, we interpret as relating policy effects to *budget* costs). The OECD's measure of market price support (estimated as part of the annual PSE calculations) will, however, be used to shed light on two issues. First, in the second regime, when the dairy premium replaces part of market price support and thereby adds to the budget cost, there *should* be a reduction in the level of market price support as prices fall. The market price support component of the PSE will be one of the indicators used to check this prediction. When interpreting differences in budget expenditure before and after the start of 2004, any offsetting fall in price support coming directly from consumers should be borne in mind as part of the wider context. Second, economic theory indicates that when the proportion of a given amount of producer support being transferred in the form of a direct payment is larger, its *transfer efficiency* (i.e. the share that actually reaches the producer rather than leaking away (or being "captured") by other related sectors such as upstream and downstream segments of the chain) is higher. This prediction will also be checked using PSE concepts.

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[82] Note that such an adjustment is not made in the calculated PSE for dairy. The decoupled milk payment disappears from this estimate in its year of decoupling. However, it still remains in the taxpayer cost of support to the agricultural sector as a whole.

Finally, if the evaluation period had not contained this discrete shift from market price support to direct income price support, the case for ignoring transfers from consumers altogether and looking only at budget-financed expenditure would be stronger. However, given that minimising budget costs is not a final goal in itself but always has to be viewed in the context of maintaining or improving social welfare, if changes in budget expenditure alone are directly linked to changes in other indicators of welfare, the latter need to be taken into account. To justify focusing only on changes in budget expenditure, it would not be enough to know that there was no shift *between* consumer-financed support and budget support; it would also have to be assumed that the amount of consumer-financed support remained more or less constant regardless of changes in budget support. This is clearly not the case here. On the contrary, a fall in the institutional price level and a smaller price gap were integral parts of the policy reform.

13.2 Methodology used for answering EQ9: efficiency

13.2.1 Estimating the SFP equivalent of the DP

The methodology for estimating the decoupled direct payment received by producers after decoupling of the dairy premium (DP) differs between EU-15 and EU-12.

Member States of EU-15 began receiving the DP in 2004. In a year of their choosing, but not later than 2007, this payment had to be decoupled from milk and incorporated into the Single Farm Payment (SFP). For the five Member States of EU-15 that decoupled in 2005, the quantity of milk approved for the DP in 2004 was multiplied by €16.31 in 2005, and by €24.49 for 2006 and subsequent years. For those five MS that decoupled in 2006, the quantity of milk that was approved for the DP in 2005 was multiplied by €24.49 in 2006 and subsequent years. For the remainder, the quantity of milk that was approved for the DP in 2006 was multiplied by €24.49 in 2007 and subsequent years. In all cases, if the quantity of milk produced in years after decoupling fell below the quantity produced in the last year for which the DP was coupled, the amount of the SFP 'attributed' to previous dairy policy is reduced proportionately. This adjustment is not applied if the quantity of milk in subsequent years rises *above* that of the last year with decoupling.

Six of the twelve New Member States paid Complementary Direct National Payments to milk producers during the period 2005 to 2008. Beyond this year, these payments were decoupled from milk and absorbed into the Single Area Payment (SAP). Data on the total amount paid by each of the MS concerned in 2008 are available, and are projected into subsequent years as that part of the SAP 'inherited' from former support for dairy, and with the same adjustment for a fall in production as described for the countries of EU-15. This procedure involves a small degree of under-estimation, since no allowance is made for the MS that, from the outset, treated the DP as decoupled and incorporated it into the SAP.

13.2.2 Sources and estimates of other payments from the EU budget

Information on EU budget payments for market support measures (consumption aids, export refunds, intervention storage aids, private storage aids) has been taken from budget figures, originating in DG Budget and supplied by DG AGRI. Data on direct payments from the EU budget to the milk sector are taken from the PSE data base (2011). These data are provided to the OECD by the European Commission according to a standard methodology that systematically reports all policy-related payments attributable to dairy policy. The figures from this source were cross-checked with budget data supplied by the Commission.

For part of the period covered, levies paid *to* the EU budget by producers and dairies on over-quota deliveries were substantial. Although the motivation for the super-levy was to dissuade over-quota deliveries rather than to generate revenue in order to 'self-fund' dairy surplus disposal, these payments are treated as offsets to expenditure on market support measures for dairy (rather than, say, as 'administrative costs') when calculating total budget expenditure, since there is a causal link between over-quota production and higher costs of balancing the market.

13.2.3 Sources and estimates of national budget payments

The main data source is the OECD's PSE data base. This database provides a continuous annual record according to a consistent set of definitions over a number of years (also adjusted automatically to account for successive EU enlargements). In addition, the Article 69 payments used by Spain in the dairy sector from 2006 onwards are included.

13.3 Judgement criteria, indicators and information sources used for each indicator

The indicators and information sources used to answer the questions concerning supply, demand and market balance are provided in Table 13.2.

Table 13.2 Indicators, data requirements and information sources for EQ9

Indicator	Data requirement	Information sources
General efficiency of the measures		
Cost of EU dairy policy	Aggregate budget costs of dairy policy (EU & MS)	DG Budget (via DG AGRI), Member States, PSE database (OECD)
	Aggregate budget costs as above per tonne of milk supplied	As above Eurostat
Cost of balancing the market	• Export refunds for dairy products • Expenditure on consumption aids	DG Budget (supplied by DG AGRI)
	Trends in expenditure on export subsidies and consumption aids in relation to trends in market surplus	DG AGRI, DG BUDG (supplied by DG AGRI)
Cost of market stabilisation	Cost of public intervention and private storage for dairy products	DG BUDG (supplied by DG AGRI)
	Cost of public intervention & private storage in relation to volatility in producer prices	DG AGRI, information from EQ2, EQ5
Cost of income support	Market price support + direct payments in the three income support 'regimes'	DG AGRI, OECD PSE data base
	Shares of market price support and direct payments relative to the farmer's gross revenue (price + direct payments) per tonne of milk produced	OECD PSE data base DG AGRI (including EU-FADN)
Transfer efficiency of support	Continuity of trends in EU dairy producer income across the three income support regimes	Calculated using data from OECD database and DG AGRI
Deadweight costs		
Private storage aids for cheese	Incentive of this contribution to cheese processors	Processors survey Other literature
Domestic consumption aids	Incentive for use by manufacturers	Processor survey
Unintended side-effects		
More exposure to price uncertainty	Summary of the evidence and reasoning presented earlier	EQ2, EQ5
Unanticipated interactions with quota markets and quota values	Quota prices in relation to decoupling, quota increases and failure to fulfil national quotas	Case studies, DG AGRI
Ageing population of milk producers	Age distribution of specialist dairy holders	Eurostat (FSS)
Simplification of policies and administrative procedures		
Savings on policy administration	Costs of quota administration, intervention management etc	Administrator survey, national sources
Savings on farmer-performed administration	Administrative costs for dairy farmers Administrative costs for processors	Producers' survey Processors' survey

The judgement criteria in most cases are based on the following principle. First, evidence is assembled on how the cost of various measures or of achieving various objectives has evolved over time, and is then matched with the impact on desired objectives. As far as is possible, these judgements will be based on a relevant comparison between the periods before and after the policy changes under evaluation. Various possibilities may arise, as shown in Table 13.3.

Table 13.3 Stylised classification of the range of judgements

	Level of attainment of objective		
Cost	Improvement	No change	Deterioration
Decreasing			
No change			
Increasing			

Objectives that fall in the cells with solid shading represent an increase in efficiency: there is either the same level of attainment at lower cost, or a better level of attainment with lower or unchanged cost. Cases that fall in the cells with diagonal shading represent a reduction in efficiency: there is a lower level of attainment despite constant or increasing policy costs, or the same level of attainment but at a higher cost. Cases falling on the rising (turquoise) diagonal will be discussed on a case-by-case basis with the aim of reaching a more case-specific judgement. The concluding section of this evaluation question will summarise the findings using this approach.

13.4 General efficiency of the measures

13.4.1 Cost of EU dairy policy

Table 13.4 summarises the average budget cost per year for the three sub-periods that correspond approximately to the three regimes "price support", "dairy premium", and "decoupled payment" as described in Section 13.2. It should be recalled that during the second of these sub-periods, decoupling of the dairy premium was not synchronised across Member States: in EU-15, five Member States decoupled in 2005, another five in 2006, and by 2007 decoupling in EU15 was complete. In EU-10, four Member States incorporated payments to milk into the Single Area Payment from 2004, while the other six did so starting only in 2009. The expenditure totals without the estimated decoupled dairy premium correspond to Definition 3 in Table 13.1, and the totals that include the estimated decoupled dairy premium correspond to Definition 2.

Table 13.4 Total budget expenditure, annual averages by sub-period

	Total, million euros			Per tonne of milk supplied, euros		
	1995-2003	2004-2006	2007-2010	1997-2003	2004-2006	2007-2010[1]
Budget expenditure (EU only) (w'out decoupled DP)	3,130.7	2,803.3	332.4	24.47	21.19	2.44
Budget expenditure (EU only) (incl decoupled DP)	3,130.7	3,861.1	3,106.4	24.47	29.19	22.71
Budget expenditure (EU + MS) (w'out decoupled DP)	3,366.8	3,038.0	775.6	26.79	22.97	5.67
Budget expenditure (EU + MS) (incl decoupled DP)	3,366.8	4,095.8	3,549.6	26.79	30.97	25.94

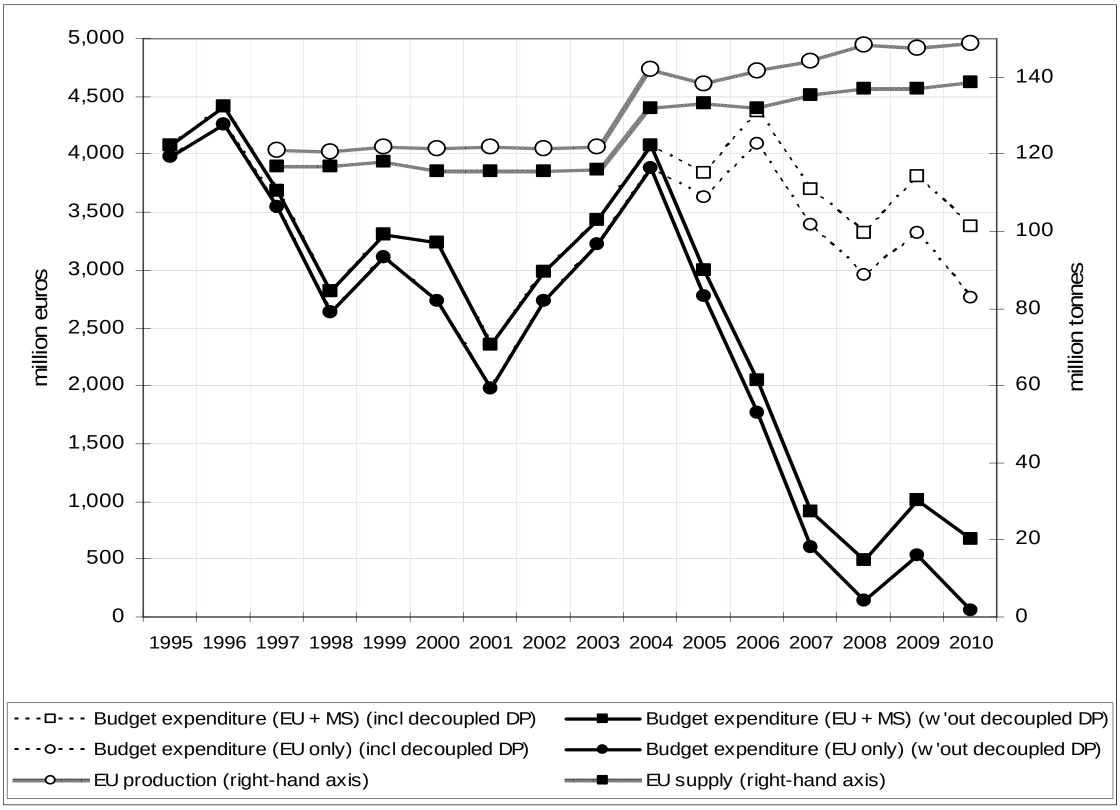
Notes: 1) Supply for 2010 provisional.
Sources: DG BUDG, Eurostat.

The summary in Table 13.4 shows that the greater part of the budget costs fall on the EU budget and the Member States' contribution is small. Moreover, whether or not the estimated cost of the decoupled dairy premium is included in the figures for the EU budget makes a crucial difference.

The EU budget cost according to Definition 3 is lower in the second, "transition" regime by about 10% only: payment of the DP began in 2004 (although at the reduced rate of 33%) yet prices did not begin to fall effectively until 2005, and surplus disposal costs were still high in 2004, declining gradually thereafter. In the third sub-period, however, with stocks and use of market management measures at a historically very low levels, and with the DP that originated in dairy policy having been fully removed from the dairy budget, annual expenditure was on average only about 10% of what it had been during the period 1995-2003. However, when an estimate of the cost of the decoupled dairy premium, now removed to another part of the budget, is included in the total EU budget cost (Definition 2), the picture changes. Average annual expenditure peaked during the transition period, but settled back to a level comparable with what it had been during the period 1995-2003. When this expenditure is standardised by the volume of milk supply (deliveries plus direct sales), the annual cost per tonne of milk is 7% lower in 2007-2010 than in 1997-2003 (supply being roughly 20 million tonnes higher due to enlargements).

The evolution of the different cost totals, as well as that of production and supply, is shown in Figure 13.1.

Figure 13.1 Total budget costs (EU and Member States), 1995-2010[1]



Notes: 1) 2010 figures are provisional.
Sources: DG BUDG, OECD PSE database, Eurostat.

The fall in budget costs attributed to current dairy policy after 2004 is dramatic. Examination of more disaggregated indicators later in this chapter will provide the explanation for this fall. Once decoupling is complete, the estimated cost of the ex-dairy premium, which is included in the points joined by dotted lines, comes to €2.7-2.8 billion, and constitutes the lion's share of cost as calculated according to Definition 2. This is roughly comparable to what was being spent on market support measures in the period 1998-2003.

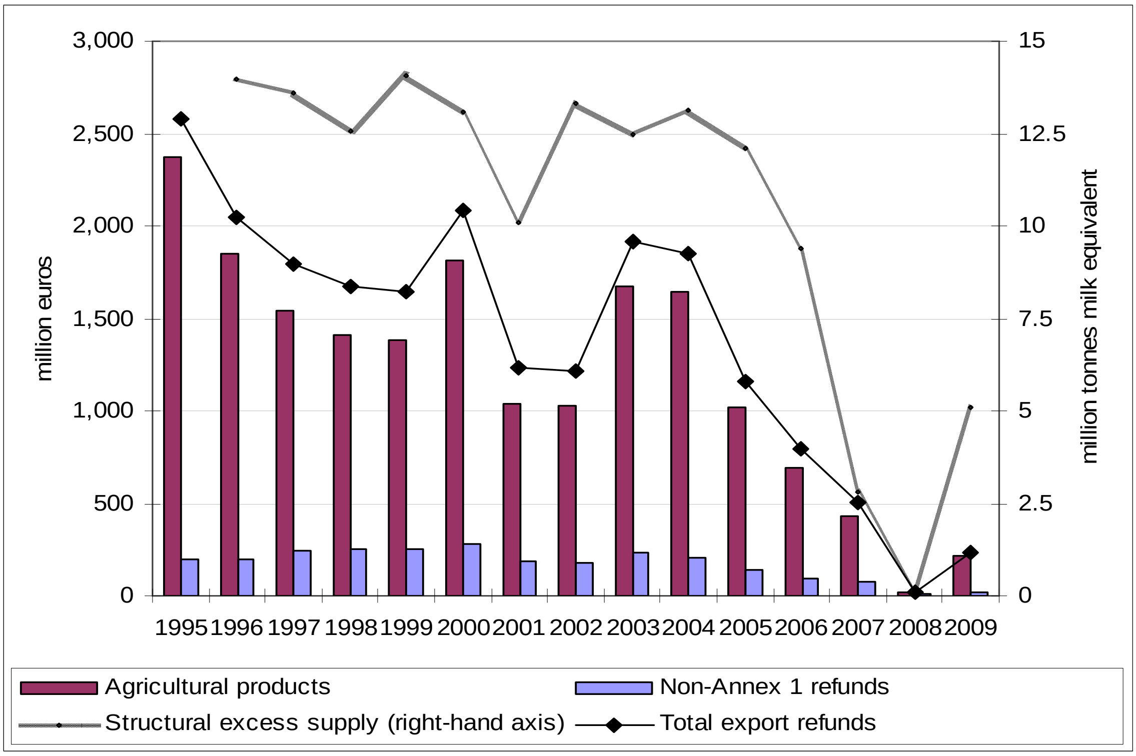
13.4.2 Cost of balancing the market

The measures used during the period for dealing with the structural excess supply of milk and milk products are export refunds and aids to domestic consumption. In the period up to 2003, Figure 13.2 shows that expenditure on export refunds followed movements in structural excess supply with a lag of about one year.[83] This confirms that excess supply on the domestic market is one of the causal factors

[83] The budget figures for export refunds are given for split years (e.g. 1994/95). To compare them with data in calendar years, they have been allocated to the first of the two years. Thus, expenditure in 1994/95 is allocated

behind changes in export refund activity. Refund expenditure began to fall sharply after 2004, reaching very low levels in 2008 with the over-heating of world dairy markets, but started to rise again in 2009 as the milk surplus increased again.

Figure 13.2 Export refund expenditure and structural excess supply, 1995-2009



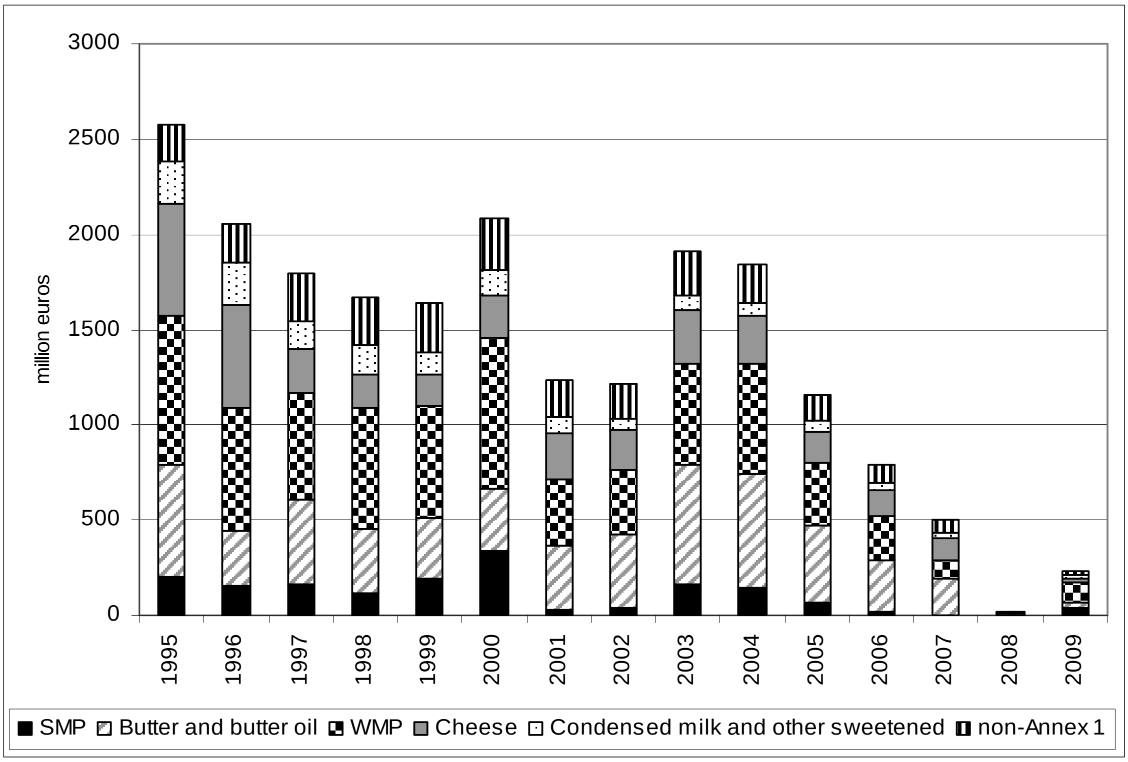
Notes: See note at the foot of the page for definitions of agricultural goods and non-Annex 1 goods.
Source: DG BUDG.

Figure 13.3 shows the breakdown of expenditure over products for the period 1995-2009. The scale of the graph is too small to show clearly the breakdown for 2008 and 2009. In 2008, over 60% of refund expenditure was on butter and butter oil, and the rest largely on non-Annex 1[84] products and condensed milk, whereas in 2009 whole milk powder attracted a large share of the refunds (over 40%) with the rest allocated over the other products. Indeed, over the period as a whole, the largest individual share of expenditure went on export refunds for whole milk powder. It is noticeable that export refunds for cheese have been in gradual decline over the period shown. Although the EU's world market share for cheese was between 40 and 50% over the period (on average slightly lower after 2004 than before 2004) (see Table 2.6), an increasing share of cheese exports is finding its way to export destinations without payment of a refund.

to 1994. This means that the true lag between a movement in the surplus and a related movement in refund expenditure one year later is somewhat greater than a year.

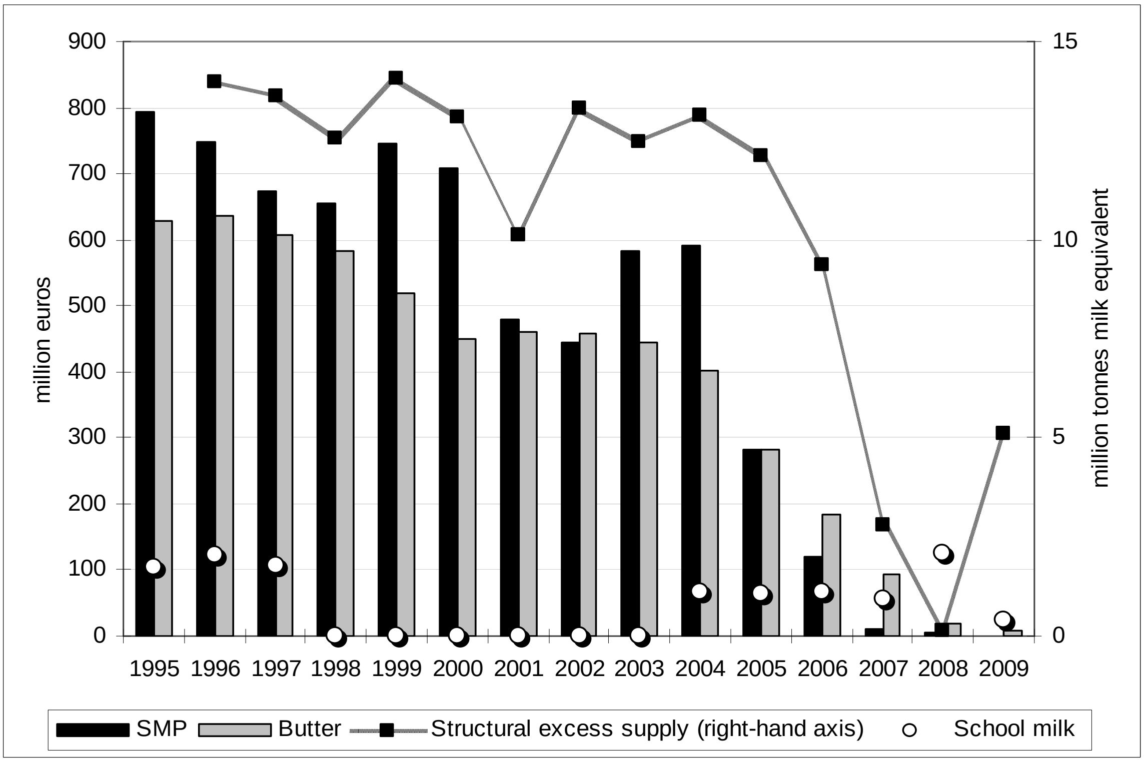
[84] Annex 1 of the WTO Agreement on Agriculture of the 1994 Uruguay Round Agreement defines agricultural products according to their codes in the harmonised system of product classification. The CAP refund system also covers (according to the share in their composition of an agricultural ingredient) various goods manufactured from these agricultural products, such as sugar confectionery, preparations of malt extract, pasta products, bread, pastries, biscuits, sauces and soups. These goods are referred to as 'Non-Annex I goods'.

Figure 13.3 Composition of export refunds by product type, 1995-2009



Source: DG BUDG.

Figure 13.4 Expenditure on aids to domestic consumption (SMP, butter and school milk)



Source: DG BUDG, own calculations.

Figure 13.4 depicts expenditure on aid for domestic use of skim milk[85], butter[86] and the school milk programme. This expenditure is compared with the evolution of the structural excess supply of milk. Expenditure on aids to butter consumption fell during the period in several steps: between 1996 and 2000, and again from 2005 onwards. Expenditure on aids to domestic use of SMP shows more variability between years.

Table 13.5 Correlation between changes in structural excess supplies and changes in expenditure on measures to balance the market

	Structural excess supply (milk equivalents)		Butterfat excess supply		Protein excess supply	
	Action in current year	Action with one-year lag	Action in current year	Action with one-year lag	Action in current year	Action with one-year lag
Export refunds	0.416	0.485				
Domestic aids[1]	0.344	-0.018				
Refunds butter			0.338	0.535		
Refunds SMP					0.101	0.578
Refunds WMP			0.219	0.226	0.209	0.574
Refunds cheese			0.173	0.558	0.077	0.729
Domestic aid butter			0.553	0.096		
Domestic aid SMP					0.193	0.423

Notes: 1) Domestic aid covers expenditure on consumption aids for butter, SMP and school milk.
Source: own calculations.

Table 13.5 reports the correlation coefficients between *changes* in the structural excess supply of milk, and in the excess market supplies of butterfat and protein[87], on the one hand, and *changes* in expenditure on the various measures for stimulating demand for dairy products in order to increase market off-take.[88] An interesting pattern emerges. *Export refunds* generally reacted more strongly after a year's delay than in the same year to an increase in the structural surplus. By contrast, for two of the three types of excess supply shown, the link between a change in a surplus and an accommodating change in expenditure on *domestic aids* was substantial in the *same* year, but negligible after a year's delay. The exception occurs or a change in the protein surplus, which elicits a stronger reaction from domestic aids after a year's lag. It is interesting to note (this is not shown in the table) that there is a strong positive correlation between changes in refunds and in domestic aids for each of the two basic products, butter (0.665) and SMP (0.722), indicating that these instruments were used in a mutually reinforcing way rather than as substitutes for each other. Unfortunately, the period for which data are available (and which is relevant to the evaluation) is too short to compare correlation coefficients calculated for sub-periods (for example, before and after the 2003 reform). What the evidence in Table 13.5 does establish is that expenditure on these measures was responsive to market management needs over the period as a whole.

Structural excess supply arises because, at the price level given by trade measures and intervention prices, market supply is greater than unsubsidised market off-take. Export refunds and consumption aids are instruments for disposing of the excess supply once it has been created, but they do not determine or influence the size of the excess supply, which is given by underlying demand and supply conditions. Therefore, the cost of surplus disposal per unit of a *given* surplus is a crucial indicator of the efficiency of

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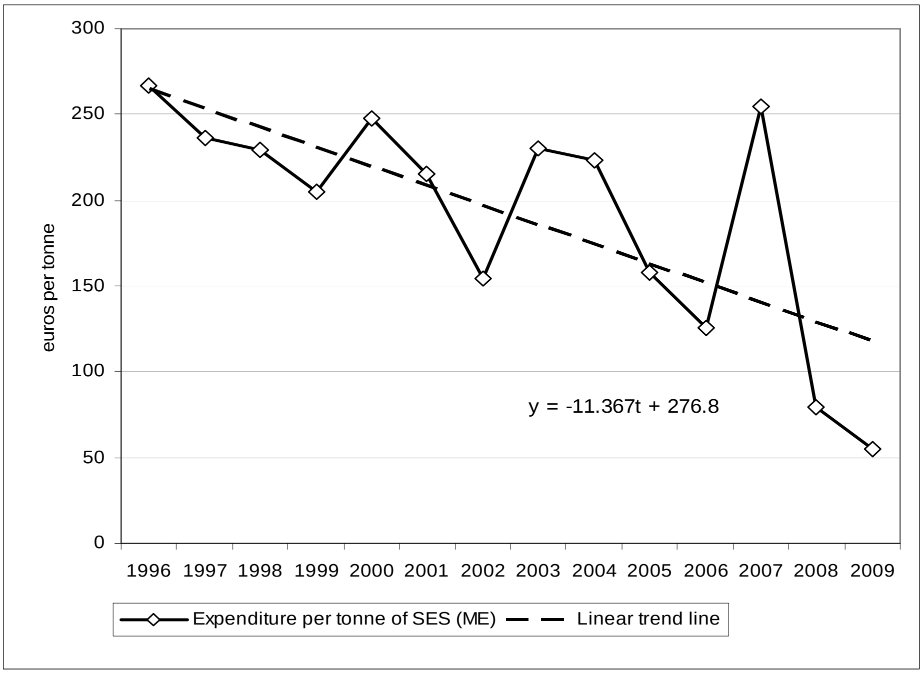
[85] Most of the aid was in the form of subsidies to SMP, for use as animal feed and for processing into casein, although up to 2001 some of this aid also went on skim milk in liquid form used for animal feed.
[86] To stimulate the use of butter and concentrated butter in manufacturing, and as aid to the armed forces, non-profit-making organisations and persons receiving social assistance.
[87] Structural excess supply is measured in tonnes of milk equivalent, structural surpluses of the individual components are measured in tonnes (of fat, protein) (see EQ1).
[88] The table shows simple correlation coefficients between each pair of variables during 1997-2009(8), as recorded either both in the same year or with the disposal measure recorded in the year after the recording of the surplus (implying a delay in taking action to dispose of the surplus). Because of the heavy trending of the most of the variables, the correlation coefficients are measured as changes from the previous year in order to remove spurious correlation due to their trends. This is a more demanding check on whether or not two variables are related to each other.

these measures. Figure 13.5 plots the expenditure on refunds and consumption aids per tonne of structural excess supply over the period 1996-2009. There is considerable annual variation. The linear trend line indicates that, on average, annual disposal expenditure fell by about €11 per tonne per year in nominal terms over the period, indicating improving efficiency.

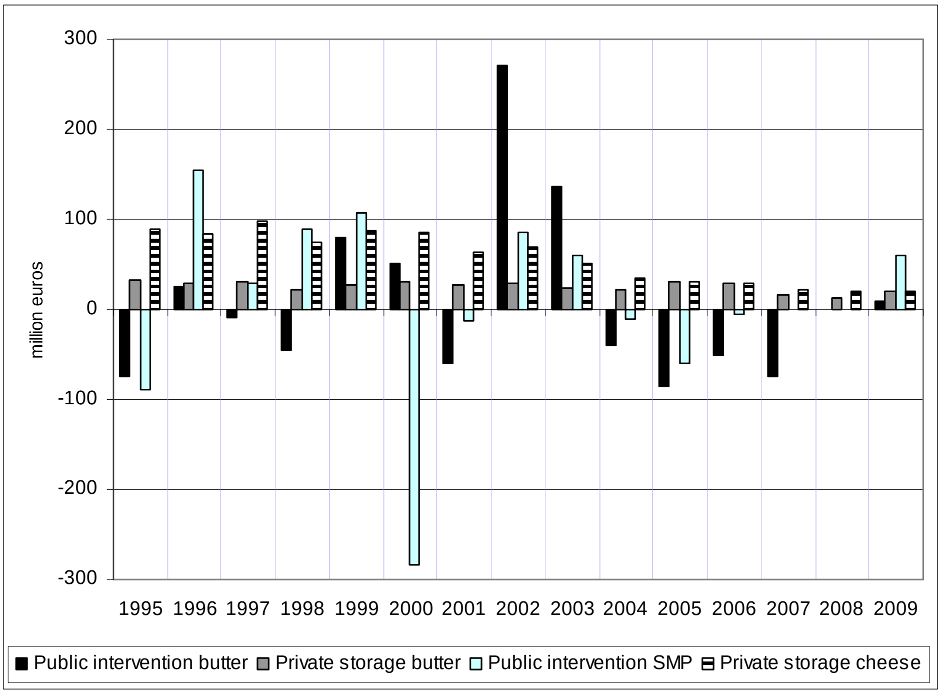
Figure 13.5 Budget cost of export refunds and consumption aids per tonne of structural excess supply



Source: own calculations.

13.4.3 Cost of market stabilisation

Figure 13.6 Budget cost of public and private intervention stocks, 1995-2009



Source: DG BUDG.

Figure 13.6 shows the net annual cost of intervention purchase, sales and storage (public intervention) and storage (private intervention) over the period 1995 to 2009. The subsidies to private storage follow a declining trend, but with very little variability around this trend. Clearly, these stocks were not used primarily for market stabilisation *between* years, although they may have played a role in stabilising seasonal market variations *within* each year (this cannot be verified from the annual budget data). By contrast, the figures on public intervention emphasis the role played in stabilising markets *between* years by intervention stockholding and market trading in and out of intervention storage for butter and SMP. In years where public intervention expenditure is negative, this means that net destocking over the year was sufficiently important to more than offset the costs of storage and depreciation.

Table 13.6 summarises the average annual budget cost of public and private stockholding activities in different sub-periods. It should be recalled that the net cost of public intervention includes buying and selling as well as storage costs, and therefore in some years is negative, whereas budget expenditure on private stocks covers only the storage subsidy which is always positive. The sustained running down of public stocks during the period 2004-2006 shows up strongly in these figures, as does the gradual decline in subsidies to private stocks. The figure shows considerable cost savings on these two items of budget expenditure since 2003.

Table 13.6 Average annual expenditure (€ million) on intervention stocks by sub-period, 1995-2009

	1995-1999	1999-2003	2004-2006	2007-2009
Public intervention	54.39	87.17	-84.97	-1.81
Private intervention	114.69	98.71	58.54	37.50

Source: DG BUDG.

Since the primary purpose of intervention stockholding measures is to stabilise markets, their efficiency has to be examined in relation to this objective. As long as the level of achievement of the objective has been maintained or enhanced, the evidence in Table 13.6 can be interpreted as a strong increase in the efficiency of these measures.

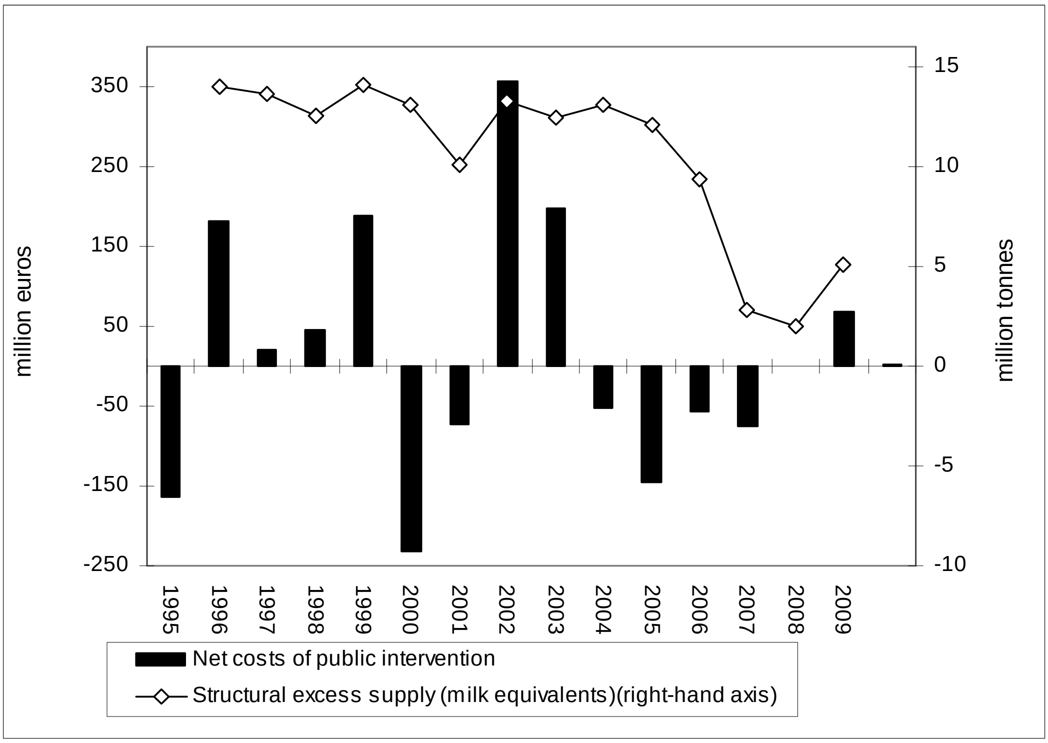
As already stated, it is not possible to discern in the annual data what role the private stockholding measures played in smoothing seasonal fluctuations. Regarding public intervention, it is appropriate to examine its role in relation to annual variation in the structural excess supply (trigger for action) and in the degree of price stability achieved (impact of action). Therefore, the evaluation of these measures should relate them to the achievement of this objective.

Figure 13.7 shows that public intervention activity has been responsive to annual changes in structural excess supply (measured in milk equivalents). There were generally net increases in stocks in those years when the difference between supply and unsubsidised demand increased, and net decreases in years when the structural economic surplus was falling. Thus, public intervention measures were used appropriately in order to counteract changes in market imbalance.

Figure 13.8 attempts to shed light on the results achieved in terms of price stability. This figure shows the *absolute value* of the net budget impact (such that in years when budget costs were negative they are measured with a positive sign). Thus, the variable as shown can be interpreted as a proxy for the extent of intervention activity (whether positive or negative) in an attempt to smooth year-to-year market instability. Unfortunately, the annual data at our disposal do not allow the development of a proxy for within-year stabilisation activity. Figure 13.8 shows that up to and including 2006, intervention activity was successful in keeping the volatility of domestic milk prices low (and well below that of world market prices, see EQ2). However, from 2007 onwards, when the world market milk price equivalent for the basic products butter and cheese rose above the internal EU intervention milk price equivalent, there was no point in EU intervention buying (the world market price was more attractive to suppliers). This situation was more likely to occur because of the reduction in intervention price levels due to the 2003 reform.

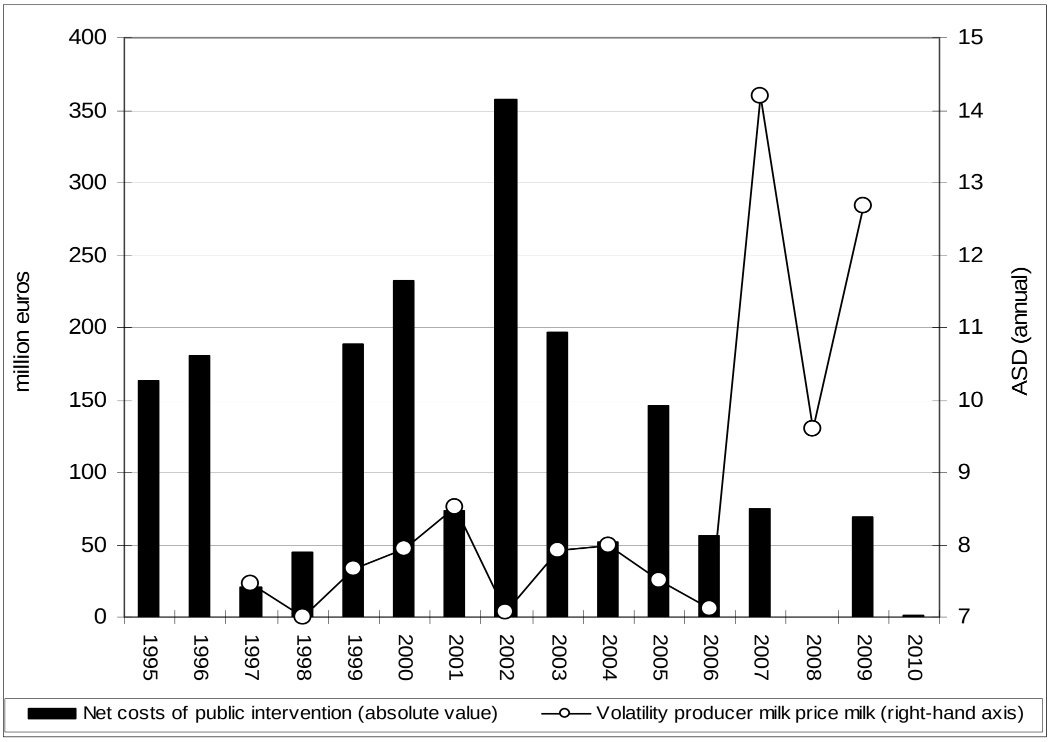
At the same time, the role for export subsidies on these two products also disappeared (as the price gap was negative). Hence, the two measures in the dairy policy portfolio that normally serve to stabilise domestic prices were rendered ineffective. As a consequence, the volatility of the EU milk price rose to what was historically a very high level.

Figure 13.7 Cost of public intervention relative to movements in structural excess supply



Source: DG BUDG, own calculations made for EQ1.

Figure 13.8 Intervention activity and milk price volatility, 1995-2009



Source: DG BUDG, own calculations for EQ2.

The conclusions that can be drawn regarding the efficiency of the intervention system are the following. First, intervention activities have been a diminishing item in the EU agricultural budget, and have been used appropriately to deal with variations in the market conditions. Second, up to and including 2006, this activity was effective in stabilising the internal milk price. However, from 2007, the high level of world market prices rendered intervention ineffective for stabilising internal prices, and this allowed the unusually high level of world market price volatility to be transmitted to domestic prices.

Evaluating the efficiency of a measure involves assessing "the extent to which the desired effects are achieved at a reasonable cost". In this case, the desired effects were not achieved in 2007 to mid-2009. At the same time the cost of the measure was also very low because it was hardly used, because the prevailing conditions were inappropriate for its use. Thus, the decision not to use it can be viewed as "efficient". Most importantly, this episode reveals a gap in the measures available within the dairy CAP to deal with such a situation. If it is considered that this situation is likely to occur more frequently in the future, then additional means have to be put in place either to reduce the transmission of price volatility from world markets, or to shield producers (or help them to protect themselves) from the consequences from greater price volatility.

13.4.4 Cost of producer income support

CAP dairy policy involves transfers from both consumers (via higher market prices) and taxpayers (through direct payments from the EU and Member States' budgets). This evaluation question focuses on the efficiency of budget expenditure in achieving policy goals. However, because the evaluation period has witnessed a shift of support away from consumer transfers and towards budget transfers, the evaluation would be incomplete if the efficiency of this shift itself were not examined. It is almost certain that the shift of some support out of market prices and into direct payments will cause an increase in budget expenditure, even after the lower budget costs of supporting market prices are taken into account. But this does not necessarily mean that dairy policy has become more onerous to the economy as a whole. The reduction in the burden on consumers has also to be taken into account when judging the overall efficiency of the policy change.

Data on budget expenditure are readily available. Information on transfers from consumers has to be estimated, and there is more than one way of doing so. In this analysis, the approach taken by the OECD is used. According to this methodology, *market price support* (the non-budget element of support to a commodity sector due to the policies targeting that sector) is measured as the gap between domestic and world market (border) prices (i.e. the price paid at point of entry of an import before duties), times the volume of domestic production.[89] The underlying assumption is that, without the intervention of dairy policy, consumers would pay world market prices for dairy products, and that these prices would remain unchanged at their current values if all dairy measures were abolished. Of course, given the size of the EU and its share of world markets for dairy products, it is inevitable that world market prices would be higher than at present if EU dairy policies were abandoned. Therefore, the estimate of market price support obtained using this methodology should be treated as an upper limit of the true size of the transfer if it could be measured using a more accurate counterfactual.

This section examines the change in consumer transfers relative to the change in budget expenditure after the 2003 policy reform, with and without taking account of the ex-dairy premium budget payment (i.e. that part of the SFP that was formerly the dairy premium before it was decoupled). It first examines the evidence based on actual estimates of market price support (MPS). Then, in order to allow for the fact that in the years 2007-2009 the price gap became very small due to exceptionally high world market prices[90], the question is re-examined using estimates of the price gap that would be expected if world prices had stayed at their 2004-2006 level, and if EU domestic prices had remained above world market prices but gradually tracked downwards following the reductions in intervention prices.

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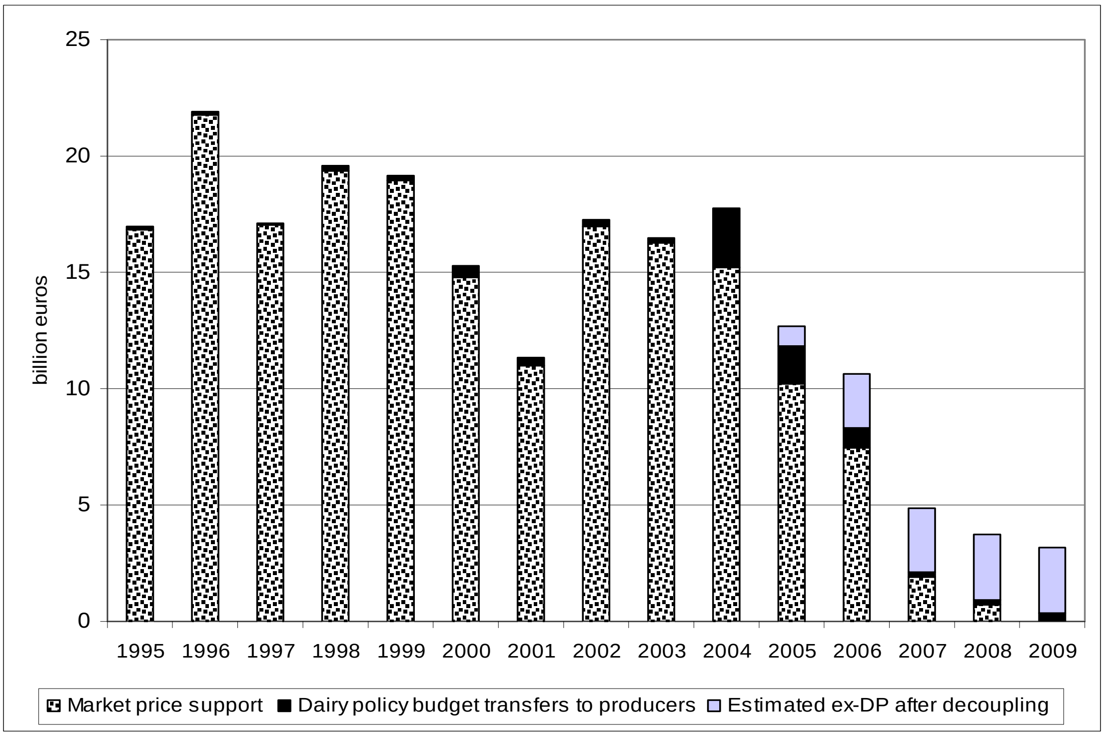
[89] The *net transfer from consumers* ('consumer transfers') is measured as market price support less any subsidies on consumption that result from sectoral policy. This is the difference between what domestic consumers pay for agricultural production and what they would pay if there were no policies supporting agriculture. It is important to note that the consumer transfer measures the cost to consumers, not necessarily what is received by producers. Much of this transfer is absorbed by other stakeholders, such as input suppliers, who supply inputs at above cost and landowners whose rent is higher than it would be if agriculture were not supported. For the EU milk sector, net transfers from EU dairy consumers have risen from around 87% of market price support in the mid-1990s to nearly 100% in 2010.

[90] The analysis of evaluation question 2 shows that in 2007 and 2008, the world milk price equivalent based on world market prices of butter and SMP was well above the EU's milk price equivalent based on intervention prices of these basic dairy products.

Figure 13.9 shows the evolution of consumer and taxpayer transfers to the EU dairy sector. The 'EU' relates to its territorial configuration in the year in question. Thus, underlying these figures there is an increase of over 20 million tonnes of milk production between 2003 and 2004 caused by the accession of ten new Member States. Changes in the MPS before 2004 are caused largely by variations in the price gap due to changes in world market prices and exchange rates. From 2004 onwards, the price gap is squeezed from both sides: falling domestic prices (due to the 2003 reform) and rising world market prices. The years 2004, 2005 and 2006 see a marked increase in budget transfers to the sector because of the dairy premium, which disappears from the category of *budget expenditure due specifically to dairy policy* from 2007 onwards following decoupling. The grey-shaded segment of each bar is our estimate of this budget item after decoupling. Even taking into account the value of the decoupled dairy premium, it is obvious from Figure 13.9 that the rate at which budget payments (taxpayers) replaced MPS (consumers) was roughly €5 of MPS less for €1 more of direct payment. This implies (but subject to a number of caveats) that each euro of the additional budget expenditure resulting from the switch from market price support to direct income support was about five times more efficient in supporting income than when that euro was paid through higher market prices. Clearly, this vastly over-estimates the efficiency gain due to the policy change, since part of the reduction in the price gap in 2007-2009 was due to rising world prices (independent of EU policies), and not policy-induced falls in EU domestic prices. In the coming years, given the degree of EU border protection, a price gap is likely to re-emerge.

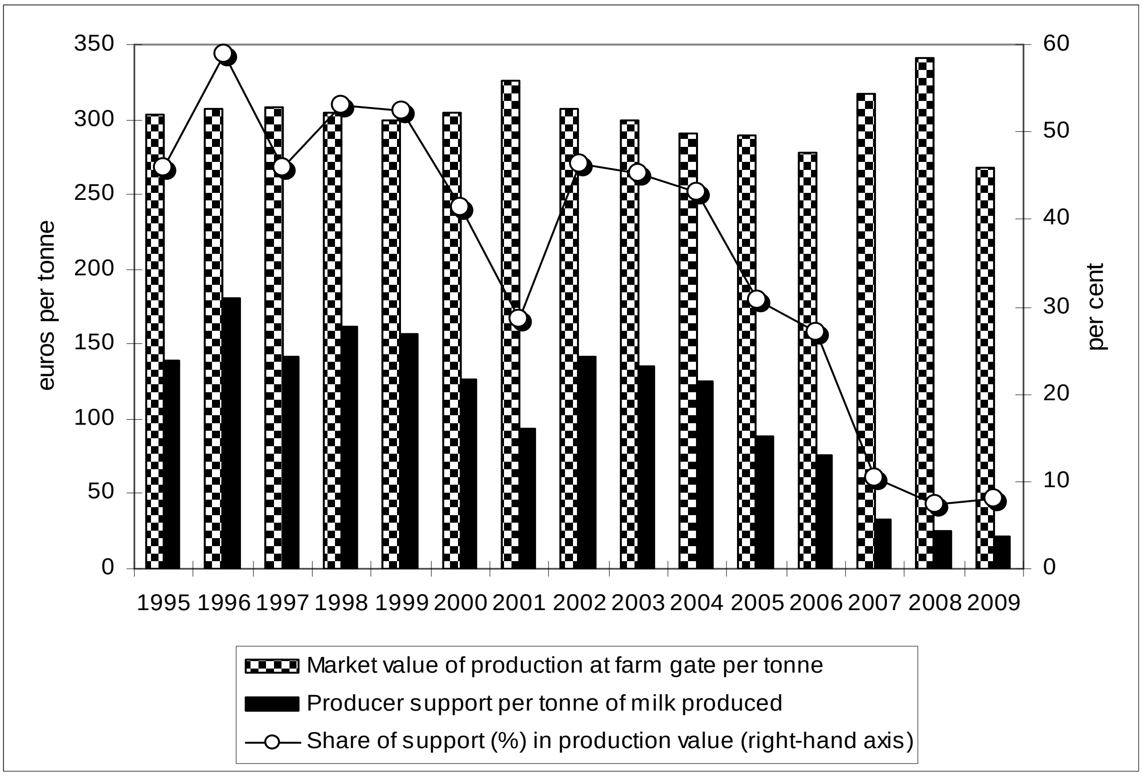
Figure 13.9 Total support to milk production, 1995-2009



Source: OECD database, DG BUDG, own calculations.

Figure 13.10 shows support (MPS as actually measured, plus budget expenditure due to dairy policy, plus the estimate of the ex-dairy premium) relative to the farm-gate value of production per tonne (including the estimated value of on-farm use of milk). The share of production value coming from support is historically very low in 2007-2009 (10% or less), but as already indicated, a considerable part of this is due to the surge in world market prices rather than to EU policies.

Figure 13.10 Support from consumers and taxpayers relative to production value, 1995-2009

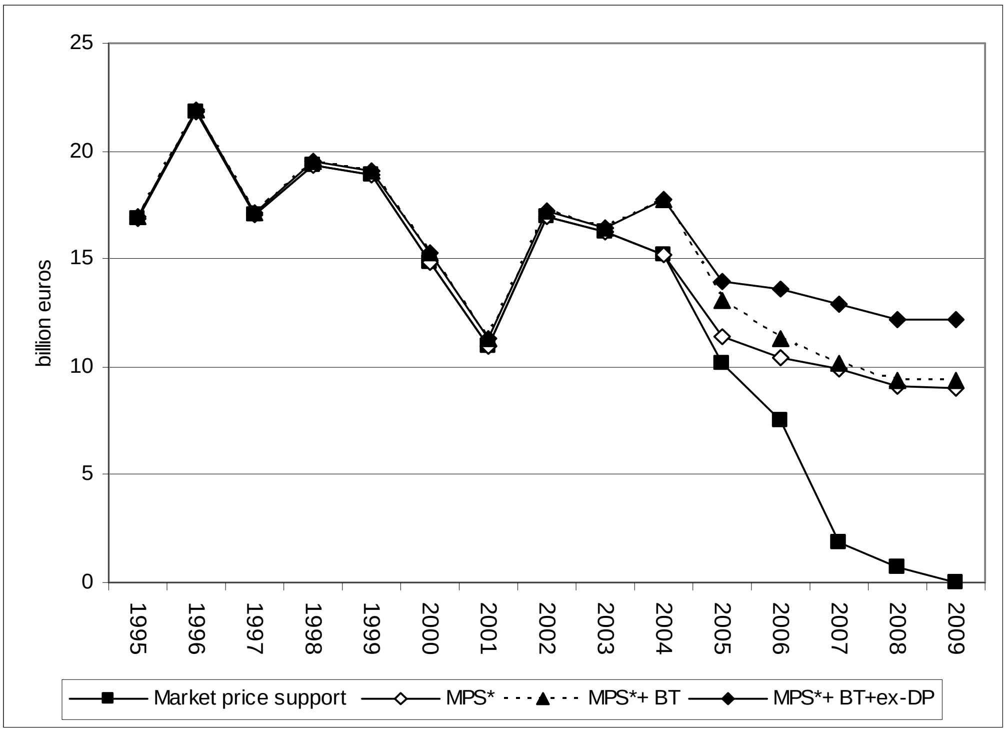


Sources: OECD PSE database, DG BUDG.

The extreme world market conditions of 2007-2009 meant that for the greater part of that period the price gap between EU prices and world market prices for intervention products was negative (hence set to zero in the PSE database), and also that EU producer prices were strongly influenced by world market prices, recording an unprecedentedly high peak (see EQ 2). This means that the movement in the MPS shown in Figure 13.9 is strongly affected by events that are unrelated to EU policy changes.

In order to remove the impact of these external events and obtain an estimate of how the MPS would have changed if world market conditions had remained as they were in 2004-2006, the MPS has been recalculated from 2005 onwards assuming that border prices remained at their 2004-2006 average, and that EU prices continued to be relatively insulated from world market price movement so that the gradual decline in domestic price intended by the policy changes (lowering of intervention prices) dominated. The EU internal price has been reduced linearly between the prices recorded in 2004 and 2008 to converge on the value observed for 2009, rather than following the price spike that was actually observed over that period. It must be emphasised that this calculation is based on rather crude assumptions, but nevertheless the calculations give an idea of the order of magnitude of the change in MPS due to EU policy changes alone. The evolution of the MPS derived under these assumptions (denoted MPS*), and the total support figures incorporating this estimated MPS are shown in Figure 13.11.

Figure 13.11 Support from consumers and taxpayers (assuming 'normal' market conditions in 2007-2009)



Notes: MPS* is the estimate of MPS assuming the world market prices remained at their 2004-2006 average; BT is budget transfers to producers as a result of dairy policy (in PSE jargon 'producer single commodity transfers'), and ex-DP is the estimated value of the former dairy premium, now absorbed into the SFP.

Sources: OECD database, DG BUDG, own calculations.

Table 13.7 summarises the averages of the series shown in Figure 13.11 for various sub-periods of interest.

The analysis shows that, even when the ex-dairy premium is accounted for as part of the budget expenditure going to the dairy sector, the total transfer from consumers and taxpayers due to dairy policy *and those inherited from past dairy policy* is lower in the post-reform period than in the period leading up to the 2003 reform, once the fall in 'normal' MPS is accounted for. On average, this support was already 5% lower in the transition 'dairy premium regime' (2004-2006) and would have been about 22% lower in the period 2007-2009 without the turbulence in world dairy markets.

Table 13.7 Levels of support to dairy according to different measures in various sub-periods, 1995-2009

	Averages per sub-period			
billion euros	1995-1999	1999-2003	2004-2006	2007-2009
MPS (based on real data)	18.76	15.60	10.96	3.35
MPS* (estimated under 'normal' world and EU market conditions)	18.79	15.60	12.36	9.35
MPS*+BT for dairy (latter as recorded)	18.94	15.89	14.05	9.61
MPS*+BT for dairy +ex-DP* (last item as estimated)	18.94	15.89	15.11	12.41
Percentage difference relative to 1999-2003	*19.2*	*0.0*	*-4.9*	*-21.9*

Source: own calculations.

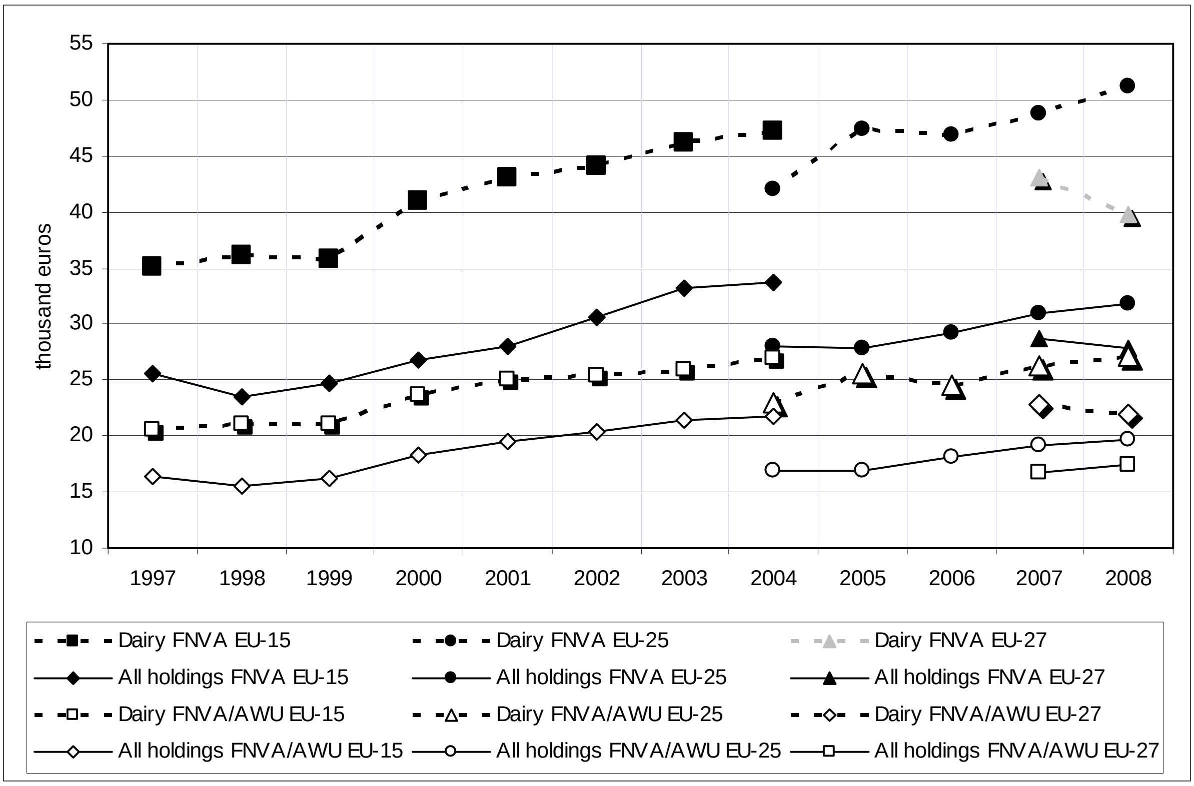
Whether the lower *total* cost (to consumer and taxpayers) means that dairy policy has become more efficient depends on whether the level of attainment of the policy objectives has been maintained or enhanced, or whether policy objectives have suffered. Analysis presented in the answers to earlier evaluation questions indicates that, in the post-reform period, market balance has improved and that dairy income per worker has been maintained. Although internal price stability deteriorated in the period 2007-2009 as a result of the world commodity market turbulence (see the answer to EQ2), this would not have occurred under the assumptions made when calculating the 'normal' MPS shown in Figure 13.11 and Table 13.5. In other words, if world market prices had remained at their mid-decade levels (and hence below internal EU prices), available stabilisation measures could have been used to reduce this imported volatility while maintaining a price gap compatible with the results shown in Figure 13.11.

13.4.5 Transfer efficiency

The degree of transfer efficiency of a policy or set of policies is measured as the share of the transfer originating in other sectors or from other stakeholders that reaches the sector concerned, as a result of the policy measures targeted on that sector. Clearly, this concept is relevant to the income support objective and the switch in the way support is provided. Transfer efficiency can be measured as the share of the average euro transferred that reaches its destination or as the share of the marginal transfer (e.g. the last euro transferred or the share of an increase in the transfer due to a policy change). Economic theory and related empirical work indicate that (leaving aside the question of policy-related transaction and implementation costs) direct income support has a higher transfer efficiency than transfers achieved by intervening in markets, since market interventions distort economic signals for a range of economic agents and encourage rent-seeking behaviour.

The evidence presented in Table 13.7 shows that the total amount transferred from consumers and taxpayers to the dairy sector fell after 2003, but that its composition changed so that a greater share was due to direct payments. This raises the question of how much of this transfer reached milk producers. A higher degree of efficiency of the transfer due to the greater share of direct payment could well counteract the fall in the amount given up by consumers and taxpayers combined.

Figure 13.12 Farm Net Value-Added and Farm Net Value-Added per Annual Work Unit, all holdings and dairy holdings, 1997-2008



Source: EU-FADN (series compiled from Agrista).

Evidence from EU-FADN indicates that the income of specialist dairy farms continued to follow previous trends during the three regimes and that the switch of some income support out of market price support into a decoupled payment did not perturb these trends. Figure 13.12 shows the trends in Farm Net Value-added and Farm Net Value-added per Annual Work Unit between 1997 and 2008 for all holdings and for dairy holdings. Since the raw data do not come from constant EU-FADN samples, the trends have to be interpreted with some caution. Nevertheless, one can conclude that at the level of aggregation depicted, the transition between regimes cannot be detected in these figures. Figure 13.12 shows that Farm Net Value-added is consistently higher on dairy farms than for agricultural holdings as a whole. Farm Net Value-Added *per annual work unit* is also higher on FADN dairy farms despite the fact that dairying tends to be one of the more labour-intensive types of farming. The figures shown for just two years for EU-27 appear to be strongly influenced by 'transition' behaviour in the two new entrant countries, which pull the results in a different direction from that shown by the EU-25 results. It is unwarranted to attribute the downward movement in the EU-27 figures between 2007 and 2008 to the dairy policy changes under evaluation here.

Table 13.8 summarises the growth rates of two income definitions for sub-periods during 1997-2008 using the same data as displayed in Figure 13.12. Average annual income growth tended to be either similar or (generally) higher for dairy farms throughout the period except over the sub-period 2001-2004, when the rate of dairy income growth was slower than in the periods before or afterwards. One may suspect that the average growth rate for 2004-2008 was biased upwards by the unusually high prices of 2008. On the contrary, income growth between 2007 and 2008 was close to the average for the period, and the greatest year-to-year change was between 2004 and 2005.

Table 13.8 Average annual income growth (%), all holdings and dairy holdings, 1997-2008

	FNVA					FNVA/AWU				
	1997-2004	1997-2000	2001-2004	2004-2008	Average level, 2008, € thousand	1997-2004	1997-2000	2001-2004	2004-2008	Average level, 2008, € thousand
All holdings										
EUR-15	4.1	1.7	6.5			4.1	3.8	3.5		
EUR-25				3.4	31.89				3.9	19.67
Dairy holdings										
EUR-15	4.3	5.3	3.1			3.9	4.8	2.4		
EUR-25				5.0	51.12				4.2	27.15

Notes: 1) A continuous series has been formed from data tabulated for 2 or 3 years. For overlapping years (different samples), the average has been taken. 2) FNV=Farm Net Value-added. FNV/AWU=Farm Net Value-added per Annual Work Unit.

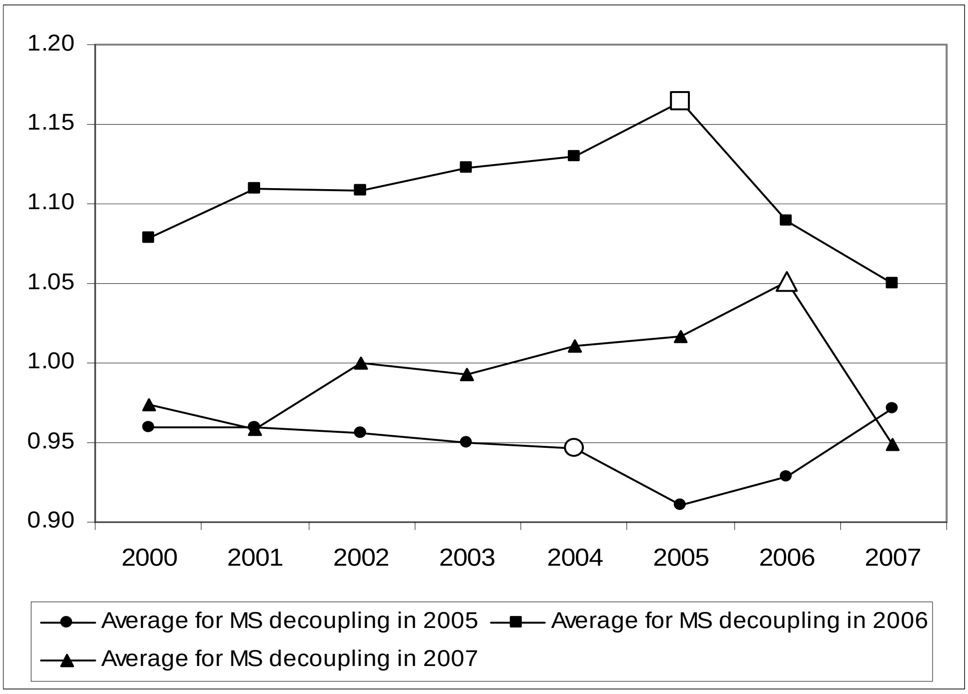
Source: EU-FADN (DG AGRI, Agrista, various years).

Figure 13.13 provides evidence at a more disaggregated level, based on the EU-FADN results reported in Table 7.9 (EQ3). The definition of gross revenue used in these figures includes coupled payments and national aids, but no decoupled payments. The Member States of EU-15 have been grouped according to the year in which the dairy premium was decoupled. In the figure, the data point representing the last year before decoupling is distinguished by a 'hollow' symbol rather than an opaque one. In each case, it is clear that gross revenue declines quite markedly in the first year of decoupling, and the fall is greater the later the decoupling occurs, since the amount of the dairy premium (first paid in 2004) was adjusted upwards in 2005 and again in 2006.

However, when decoupled payments are included in the income measure, this decoupling impact disappears. Figure 13.14 depicts the trends in Farm Net Value-added per Family Work Unit (from Table 7.5 of EQ3), relative to the EU-15 average. These income figures include decoupled payments as well as coupled payments and national aids. It is clear that the "decoupling effect" has disappeared, indicating that for these farms that continuity of income delivery was maintained during the switch from the second to the third support regime.

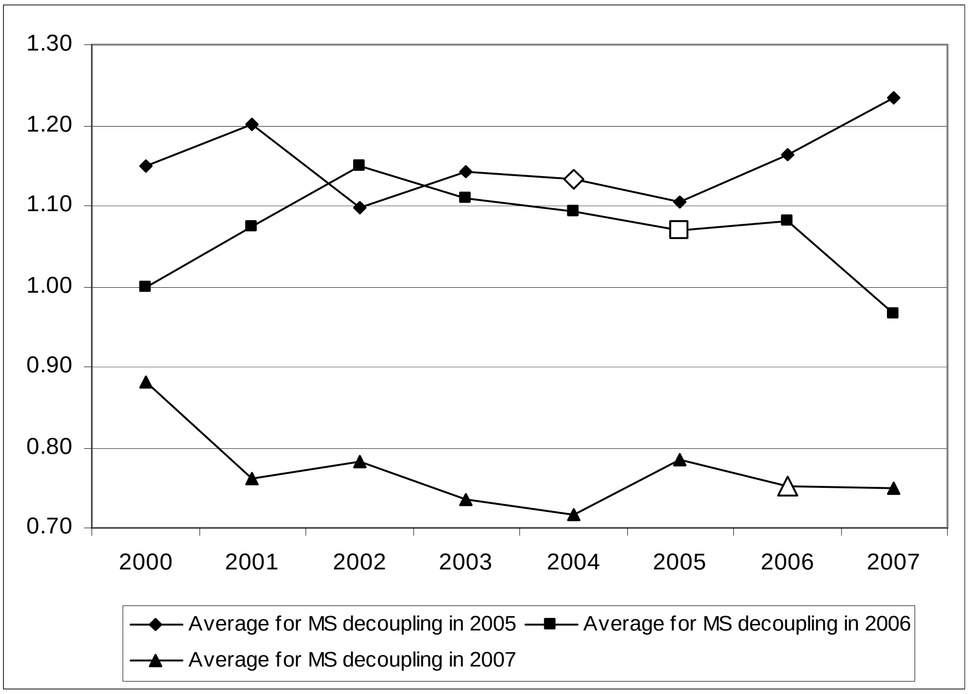
Figures 13.12 to 13.14 and Table 13.8 provide strong evidence that the reduction in the consumer plus taxpayer cost of supporting dairy incomes does indeed represent an improvement in transfer efficiency, since the total cost of support has fallen without detriment to the objective of maintaining producer incomes. However, it has to be borne in mind that the *total budget cost of support* considered separately did not fall by very much if one takes into account that some support was effectively removed from the commodity-specific dairy budget and placed in another budget category, and that the fall in *total support cost* takes into account the lower support burden paid by consumers.

Figure 13.13 Gross revenue relative (excluding decoupled payments) to the EU-15 average, specialist dairy farms, for MS groups according to the year of decoupling



Source: EU-FADN, based on evidence presented in EQ3.

Figure 13.14 Family Farm Income per FWU relative to the EU-15 average, specialist dairy farms, for MS groups according to the year of decoupling



Source: EU-FADN, based on evidence presented in EQ3.

13.5 Deadweight

The Glossary of terms used in the Common Monitoring and Evaluation Framework defines deadweight as "Changes observed in the situation of beneficiaries following the public intervention, or reported by direct addressees as a consequence of the public intervention, that would have occurred, even without the intervention."

The concept of deadweight is relevant to both effectiveness and efficiency. If an outcome would have occurred in any case without the intervention, then it should not be interpreted as an impact of the intervention and cannot be claimed as indicating that the intervention was effective. Moreover, in this case the efficiency of the intervention instrument is low or zero, since the outcome would have occurred without expenditure on the instrument.

The analysis of the effectiveness of policy measures conducted in the first eight evaluation questions indicates that they have generally been effective, although to varying degrees. The two instruments where the case looks weakest are private storage aids of cheese, and certain domestic consumption aids. These two cases will be examined in turn.

The rates of private storage aid paid for specific types of cheese during the evaluation period are set out in Table 2.47. Private storage aid for these cheeses was originally introduced to balance the distribution of CAP dairy support more equitably over Member States, which explains why it targeted the production of long-storage cheeses in southern European Member States (principally, Italy) whose overall milk deficit situation meant they did not benefit from the intervention system for butter and SMP. Private storage aid for cheese was discontinued in 2009 (Regulation 72/2009) on the grounds that "the buoyant situation in the cheese market no longer justifies storage aid".

The processors' survey asked several questions about the impact of this storage aid and its removal. A majority of the respondents considered that its discontinuation had no impact on the prices or supply of any dairy products. Half the respondents thought the abolition of storage aid had no impact on the price of cheese itself, whereas others even considered its removal *decreased* cheese prices rather than increasing them. Some respondents had regularly used private storage aid for cheese in the past (on average, for about 60% of their production). As to the specific effects of its abolition on their firm's operations, several mentioned the squeezing of profit margins, another remarked that it would reduce the ageing period, and there were comments about loss of competitiveness. However, it has to be recognised are most of the cheeses that qualified for this aid are PDO/PGI cheeses, whose minimum ageing time is closely specified in the designation of the product. Moreover, they are high-quality cheeses produced for a market that values their specific product characteristics and is willing to pay the premium for them. In the international market place, although there may be imitators there are no close competitors given the strong identity that the name and origin confers on the product. Price competitiveness in this context does not play a determining role as it does in the case of basic products like SMP or butter. Even for cheese where the ageing time is not governed by a geographical product designation, there is a market for older cheeses where consumers who prefer them will pay more for this attribute.

Published evidence from the JRC-IPTS project "Food Quality Assurance and Certification Schemes Managed within an Integrated Supply Chain"[91] indicates that the contribution of EU private storage aid to ripening costs of these cheeses was of minor importance. For example, in 2005, EU storage aid covered a little over 4% of the ripening cost for Grana Padano cheese and just 3% for Parmigiano Reggiano (PR) cheese, and this aid was about 7% and 2% of net profit at wholesale level. These orders of magnitude confirm the views expressed by the respondents to the processors' survey.

A relevant question is whether some of this aid was passed back to milk producers, thereby enhancing the income support objective of CAP dairy policy. The JRC-IPTS project referred to above provides evidence that farmers producing milk for PR cheese (in the mid-2000s) received a milk price that was about 20% above the average milk price for Italy, and that this was reflected in a gross margin about 40% higher than that earned by producing drinking milk. However, it should be borne in mind that milk production for PR cheese, and PDO cheeses generally, involves much higher total costs (due, for example to prescribed stocking rates, feeding regimes and so on) much of which is not reflected in the gross

[91] http://foodqualityschemes.jrc.ec.europa.eu/en/documents/Casestudies_8-ParmigianoReggiano.pdf

margin calculation and has yet to be deducted before arriving at a net income figure. In any case, if these cheeses would be produced anyway and in the same volumes without the storage aid, the benefit to milk producers should also remain unchanged and cannot be attributed to the storage subsidy.

The conclusion of this analysis is that the private storage aid for cheese was for some time a redundant measure, and its discontinuation has removed a source of deadweight from CAP dairy policy.

Regarding the possible deadweight arising from domestic consumption aids, such as the aid for processing SMP into casein and caseinates (which became discretionary in 2009) or the disposal aid for butter, concentrated butter and cream (which was discontinued in 2009), the issue is not whether they were still needed in 2009. As the relevant recitals in Regulation 72/2009 state, by that time their abolition or their change in status to optional *could* be justified by the current market conditions and in particular by the greatly reduced need to dispose of structural excess supplies. Rather, the relevant question is whether, in years prior to 2009 when they were in operation, the same level of off-take of these products for the designated subsidised uses would have occurred even without the subsidy.

In April 2007, the disposal aid to butter and butterfat was set to zero. Figures published by the European Court of Auditors (ECA) (ECA, 2009, p.27) show that the total off-take by the domestic market in 2008 was in line with that of 2006, when the consumption of 722 thousand tonnes of butter was subsidised at a cost of €183 million. This indicates that already by then the use of this measure was redundant. The evidence provided by the ECA on whether unsubsidised consumption replaced that of subsidised consumption of SMP after aid measures were set to zero in October 2006 is less persuasive, which undoubtedly explains why this measure was merely made optional and retained for discretionary use by the Commission in the 2009 legislation. The view that internal disposal aids have been redundant in recent years was also expressed by a strong majority of the respondents to the processors' survey, who considered that the schemes had generally had no impact on the supply or demand for dairy products, on their prices, or on market and price stability.

In conclusion, we have been unable to find evidence that these aids have played a role in stimulating additional demand for the aided products during the evaluation period whilst weak evidence to the contrary is available for the second part of that period. Hence their role in achieving market balance during that time was negligible. As for whether they have increased consumption of dairy products by specific social groups (deprived persons, school children) over and above what it would have been without subsidy, no evidence is available.

13.6 Unintended side-effects

The policies under review were designed to affect production and marketing decisions, that is, operational decisions governing the performance of the sector, and outcomes following from these decisions.

The side-effects of the policy changes that are briefly analysed in this section concern indirect consequences due to interaction with circumstances that are completely unforeseen, or – because they take longer to develop and may not be easily perceived – may be ignored or seen as easily correctible because of their slower development. Three issues are raised here: first, an increase in price uncertainty faced by milk producers in the post-2003 policy context; second, possible unforeseen complications due to the interaction between the package of policy changes and quota markets; and third, implications of the policy reforms for the incentive to enter or remain in dairying, and hence with net impacts on the age distribution of farmers.

13.6.1 Increased price uncertainty

Evaluation questions 2 and 5 analyse the behaviour of prices during the evaluation period in considerable depth, and reach the conclusion that in periods when world market prices of intervention products are above the safety-net levels, then the stabilising potential of current policies against upward price movements occurring on the world market, and against short term volatility of prices generated in world markets level, is severely weakened. In these circumstances, domestic internal prices become much more closely linked to world market prices than during periods when world market prices for basic products are below the EU safety net levels, and short-term world market price movements are more easily transmitted to domestic prices. This situation occurred in 2007-8. It had not been anticipated by policy-makers or by market participants. The price upswing increased raw material costs for processors dramatically, whilst the downswing in 2009 was unsettling and damaging for milk producers. During the months when prices remained high, the short term volatility on the world market created extra uncertainty for all participants. During this period, price transmission along the chain appears to have worked imperfectly[92], so that the windfall gains and losses were not shared in an orderly way among chain participants, nor was there equitable sharing of the higher level of risk that the chain as a whole was exposed to.

Two questions arise from this experience. First, if milk producers now expect more price volatility and have less certainty about future price levels, regardless of whether similar conditions actually do occur more frequently in the future than in the past, what will be the consequences for the sector? Milk production is an activity that benefits from long-term stability, which provides ideal conditions for building up high-performance herds and maintaining good levels of investment in technology and skills. The extent to which producer confidence has suffered and (if there has been a loss of confidence) whether there will be any lasting effects, cannot be judged at this moment. However, the milk producer survey shed some light on this issue. Only a small minority of past milk producers who had given up milk production gave increased price volatility as a reason. Moreover, in the much larger sample of producers still involved in milk production, less than 5% gave it as a reason for having seriously considered giving up milk production in recent years. However, producers clearly indicated that uncertainty impacts on their production strategies. About three out of five respondents considered that since 2003 they had been constrained or dissuaded from expanding herd size as much as they would have liked. Three out of ten of these respondents gave uncertainty about future EU policy as a reason, and over half of them said that milk price uncertainty had been a disincentive. By contrast, lack of quota availability or the high cost of quota was given as a reason by far fewer (also about three out of ten).

Second, if similar episodes are expected to be more frequent in the future, should there be a policy response, and what should it be? Within a more market-oriented CAP, a number of potential policy options for protecting producers from imported price volatility are ruled out. It is now quite difficult to frame policies for insulating domestic prices from external volatility that are also consistent with post-2003 reforms. It is more promising to examine options for helping producers to deal with greater price risk.

13.6.2 Unforeseen interactions with quota markets and quota values

The amount of quota held by a producer determines how much milk he can deliver without risk of paying the superlevy. Under EU rules, the risk of a producer having to pay superlevy depends on the probability that his dairy and his Member State will reach their respective quota limit. Thus, as long as this probability is perceived to be high, quota has an economic value to the quota holder, as it enables him to earn a return by selling milk. Even for producers who have never traded in quota, their quota holding has an asset value as long as these conditions prevail. That value is equal to the discounted future flow of economic benefits deriving from owning the quota, i.e. being able to sell milk.

In the short term, when production factors are fixed, the value per kilogramme of extra milk quota is equal to the gross margin on the marginal kilogramme of milk produced. In the longer run, when herd expansion and changes in production factors can be undertaken, its value is equal to the net value added earned on the marginal kilogramme. The first valuation perspective determines the prices paid to lease quota, whereas the second reasoning (together with the cost of capital and the producer's perception of future uncertainty) determines the purchase price. Most Member States have operated or allowed some kind of quota trading system, and many milk producers have incurred debts in order to finance quota purchases, on the assumption that they could be repaid out of future milk profits. This has always constituted an argument against the abrupt abolition of EU milk quotas.[93]

[92] European Commission (2009). Analysis of price transmission along the food supply chain in the EU. Commission Staff Working Document, COM(2009) 591.

[93] This argument does not apply symmetrically. The abrupt introduction of quotas in 1984 appeared to create windfall asset values for all quota recipients, although it was soon understood that much of the value that became attached to quota had merely been transferred from the value of other dairy-specific fixed assets,

Regulation (EC) 1788/2003 extended the quota scheme for another seven years, beginning on April 1 2008. This opened up a horizon long enough for quota purchases over the following three or four years to be fully amortised even if the scheme did not continue beyond April 1, 2015. In many Member States, quota markets were quite active at that time. However, the set of measures that took effect in the middle of the decade created some additional effects with impacts on quota values. First, the reduction in intervention prices (involving an expected fall in the IMPE[94] of around 22%) was likely to reduce the value of quota by reducing the gross margin for milk to the extent that the fall in intervention prices affects the milk price received, and the timing of the quota price fall depends on the timing of the decoupling of the dairy premium (predicted by Burrell, 2004).[95] Second, uncertainty about the effects of the new policy package and whether the scheme would continue beyond 2015 accelerated the rate of exit from the sector, making quota more available, and reduced production levels relative to national ceilings. By 2006/7, nine Member States of EU-15 were failing to fulfil their national quota limits, and with the unforeseen additional increase on 1 April 2008 (decided in 2007) by 2009/10 all EU-15 Member States (except Denmark and the Netherlands, which finished the year about 0.4% over quota) had significant production shortfalls with respect to their national quota ceiling. Most countries of EU-10 (although for more reasons) failed to fill their national quota throughout the period, and the countries of EU-02 have never done so.

Both expected and unexpected changes were at work. The switch of some milk price support to a decoupled payment was expected to reduce quota prices but only partly. This could be taken into account. It was the unforeseen changes (the collective reactions of milk producers and the 2008 quota increase) that sharply reduced quota prices and amounts traded in most Member States by 2008 or 2009, and in some (like the UK) much earlier. Once a Member State enters a phase of systematically producing under quota, quota loses its value (the risk of paying superlevy goes to zero), so whether extra quota was a sensible investment for a producer in this situation just prior to decoupling depends on whether the price paid for the quota was a reasonable outlay for securing the future additional flow of direct payment that was based on his holding of quota at the end of the last year before decoupling. It is also worth recalling that the superlevy was reduced in annual stages by over 16% between 2004/5 and 2007/8, but its dissuasive signal probably remained constant due to the reductions in institutional milk prices over the same period.

Although direct evidence on how producers decoded the signals from this complex situation is not available, it has quite probably created some winners and losers. Who they are depends on whether they bought quota before or after decoupling, the price they paid, their gross margin for milk, their cost of capital and other factors. It can be observed, however, that the relatively simple idea of announcing quota abolition and giving producers and asset markets a number of years to prepare for it became more complex due to the other policy changes introduced to take place prior to the commencement of the soft landing, creating a set of signals that some producers may have found difficult to interpret in their best interests.

Table 13.9 assembles some evidence on the quota market that was provided in the case studies for this evaluation. For each Member State, the last year before decoupling has opaque shading in the table. In most cases, quota prices and trading activity decline in the year of decoupling and generally do not recover. This is exemplified by the case of Austria, even though Austria continued to fill its national quota until the last year shown. In Germany, quota prices and quota market activity remained quite buoyant following decoupling as long as the risk of going over the national quota seemed high. In the last two years shown, however, there was a marked slowdown in quota market activity.

The cells with diagonal shading highlight years where, according to the corresponding case studies, quota market activity reacted positively to the higher prices of 2007-2008. It is striking but logical that in the Netherlands where this effect is quite noticeable, it affected the price for leased (short-term) quota only and not the price for permanent sales of quota.

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which become relatively valueless without the accompanying quota that allows them to earn income in milk production. However, the abrupt introduction of quotas did not create winners and losers within the sector.

[94] The IMPE (intervention milk price equivalent) is the raw milk price on the assumption that the milk is used to produce only butter and SMP that are sold into intervention, and that the value share of the milk in these products is transmitted by dairies to milk producers. It can be thought of as the 'floor' price for milk.

[95] Burrell, A. (2004). The 2003 CAP reform: Implications for the EU dairy sector. *Outlook on Agriculture* 33(1): 15-25.

Table 13.9 Evidence on quota transfers and prices from six Member States

Region	1999 /00	2000 /01	2001 /02	2002 /03	2003 /04	2004 /05	2005 /06	2006 /07	2007 /08	2008 /09	2009 /10
Austria	Share of quota filled, per cent										
Upper Austria		99.5	103.4	104	102.7	100.4	101.9	102.9	103.2	100.8	100.8
Austria		105.3	104.9	105.1	103.6	101.8	103.4	103.5	103.4	101.6	99.8
	Quota prices, in €/kg										
Upper Austria	1.1	1.0	1.0	1.0	1.0	1.0	0.8	0.6	0.2	0.2	0.19
Austria	1.1	1.0	1.0	1.0	1.0	1.0	0.8	0.6	0.2	0.2	0.19
	Amount traded, thousand tonnes										
Upper Austria	29.9	26.5	25.2	23.1	25.9	22.2	31.3	27.9	17.7	17.9	14.6
Austria	77.2	68.8	66.6	73.7	84.3	67.5	82.7	69.5	49.4	50.8	47.5
Germany	Share of quota filled, per cent										
Germany	-	-	100.5	99.7	101.3	101.5	99.3	100.03	101.3	99.1	97.9
	quota price €/kg										
	0.57	0.72	0.72	0.47	0.43	0.43	0.48	0.37	0.34	0.18	0.1
	Amount traded, NOT over the exchange, thousand tonnes										
Bavaria		196.5	197.3	231.2	284.4	316.2	269.4	326.7	233.9	307.9	218.1
Lower Saxony			80.4	181.3	293.6	266.7	288.9	301.3	404.9	309.5	197.3
	Amount traded over the exchange, thousand tonnes										
		18.5	227.5	225.2	448.6	543.9	410.2	522.5	641.6	485.7	536.3
Ireland	Share of quota filled, per cent										
				99.8	100.5	100.8	98.2	99.7	100.7	97.5	90
	Quota price, cents/kg										
				31	31	17.5	12	10-28	12-45	10-40	6-18
	Quota traded or transferred, thousand tonnes										
				174.3	166.2	178.1	14.7	200	124	55	46

Italy	Share of quota filled, per cent										
Lombardy	112.1	108	108.8	111.3	106.9	107.6	108.4	107.8	108.3	107.1	98.6
Emilia-Romagna	106	103.8	102.2	104.4	103.3	102.6	103.9	103.7	104.2	102.3	97.2
Italy	104.8	103.2	103.9	106.1	104.3	104.5	106.3	105.5	105.5	101.5	96.5
	Amount transferred, thousand tonnes										
Lombardy	227.2	248.4	296.3	222.5	382.7	541.4	511.1	413	414.8	375.9	358.6
Emilia-Romagna	181.7	185.3	186.6	182.5	226.4	303	237.8	178.5	220.9	178.9	213.6
Italy	811.8	883.9	912.5	738.5	1,101.90	1,418.00	1,287.40	1,117.90	1,097.50	1,042.50	1,073.00
	quota price €/kg										
Lombardy	sales			0.64	0.68	0.66	0.62	0.52			
	lease			0.08	0.09	0.09	0.10	0.09			
Emilia-Romagna	sales	mountains	PR		0.48	0.56	0.58	0.46	0.30	0.18	0.16
		plains	PR		0.47	0.53	0.55	0.35	0.30	0.18	0.14
		plains	GP		0.64	0.63	0.62	0.52	0.35	0.20	0.18
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Latvia	Share of quota filled, per cent										
					67.7	83.2	88.9	92.2	90.7	84.6	
	Amount transferred, thousand tonnes										
	...	...	...	...	9	14.5	13	32.6	31.1	23.8	18.7
	1999 /00	**2000 /01**	**2001 /02**	**2002 /03**	**2003 /04**	**2004 /05**	**2005 /06**	**2006 /07**	**2007 /08**	**2008 /09**	**2009 /10**
Netherlands	Share of quota filled, per cent										
	100.5	99.2	100.5	100.2	100.5	100.6	99.9	100.3	101.3	101.4	100.4
	Quota price, €/kg										
	purchase		1.82	1.9	1.69	1.81	1.96	1.81	0.97	0.95	0.78
	lease		0.19	0.17	0.17	0.26	0.18	0.19	0.23	0.21	0.19
	Amount purchased with or without land, thousand tonnes										
	purchase	859	812	687	837	1029	808	387	295	211	238
	Amount leased, thousand tonnes										
		614	709	690	550	224	223	182	249	297	332

Source: Compiled from the Case Studies.

13.6.3 Implications for the age structure of milk producers

Milk production is a demanding full-time activity on a year-round basis. In Europe it has traditionally attracted relatively younger farm operators and has had a smaller proportion of producers in the over-65 age group than most other types of farming.

Table 13.10 compares the evolution of the age structure over time of specialist dairy holders with that of all holders over a 22-year period. In interpreting the figures in the table, it is important to bear in mind that the number of years over which changes are recorded are very unequal.

Table 13.10 Changes in the age structure of specialist dairy farmers, 1985-2007

	Share younger than 35 (%)		Change in share younger than 45 (percentage points)			
	1995	2007	1985-1995	1995-2000	2000-2005	2005-2007
All holdings						
EU-15	7.9	5.0		0.9	-1.7	-2.4
EU-25		7.1				-1.9
EU-27		6.1				-1.7
Specialist dairy holdings						
EU-15	15.1	9.0		1.7	-1.2	-3.2
EU-25		9.8				-2.7
EU-27		8.4				-1.7
Austria	18.9	11.4		2.6	-0.8	-3.7
Belgium	21.0	8.5	8.5	1.4	-5.8	-1.3
Denmark	10.0	9.5	-3.0	15.7	-7.3	-4.0
Finland	19.0	9.7	45.9	-3.5	-4.5	-2.3
France	18.7	13.8	16.2	-4.8	3.1	-1.2
Germany	19.8	8.5	10.2	2.4	-5.3	-4.3
Greece	6.6	18.1	5.5	17.6	8.2	2.7
Ireland	15.4	8.4	6.5	4.0	-3.3	-4.3
Italy	10.4	7.4	8.3	4.9	2.5	-8.3
Luxembourg	15.3	6.3	9.6	-5.7	-7.6	-3.4
Netherlands	7.4	3.9	-2.5	1.0	8.3	-3.4
Portugal	11.6	6.6	31.8	3.4	-6.5	-2.7
Spain	10.1	10.1	26.9	9.1	-4.0	-0.4
Sweden	10.7	4.8	36.3	-4.1	-6.5	-1.3
United Kingdom	6.5	3.3	-4.8	1.2	-5.5	-1.9
Cyprus		8.3				-5.8
Czech Republic		8.0				-1.3
Estonia		3.3				-1.6
Hungary		8.3				-0.5
Latvia		5.5				-7.8
Lithuania		4.5				-11.3
Malta		10.0				-6.4
Poland		15.8				-0.6
Slovak Republic		2.6				-2.9
Slovenia		4.6				0.8
Bulgaria		4.9				-0.7
Romania		4.0				-2.2

Source: Eurostat (FSS).

The period 1985-1995 saw a marked rejuvenation of the milk producer population as a result of the imposition of quotas in 1984 and the quota buy-out programmes (largely EU-funded) that were subsequently operated in many Member States. For example, in France the share of the age group 'less than 45 years of age' increased from 28.9% to 45.1% (an increase of 16.2 percentage points), due largely to the high rate of exit of older farmers but also to the French policy of favouring new entrants in the re-allocation of abandoned quota. Between 1995 and 2000, the share of holders under 45 years of age increased its share at the level of all EU-15 holdings (+0.9 percentage points), but to a greater extent on specialist dairy holdings (+1.7 percentage points). Between 2000 and 2005, the share of this age group fell in EU-15 agriculture as a whole, but somewhat less in specialist milk production than the sector average. Between 2005 and 2007, however, the reduction in the share of this age group was much stronger for dairy producers than for agriculture as a whole. It lost ground in all countries except Greece, and in seven Member States of EU-15 the loss (in percentage points) was over 3% over these two years alone.

It should be recalled that, between 2000 and 2007, EU-15 lost 33% of its dairy herds. Table 13.10 therefore indicates that the age group under 45 years old has shrunk at an even faster rate. This is mainly due to lower entry rates and higher exits from the sector of discouraged under-45 farmers who felt young enough to embark on a different activity.

In summary, the cumulative effect of changes between 1995 and 2007 (compare the first two columns) indicate a considerable ageing of the milk producer population, a large share of which has occurred since 2000, and especially between 2005 and 2007. The reader is warned that correlation should not be confused with causality. However, the changes in trends that had persisted for a number of years prior to the reform period, together with the absence of any other shock of comparable importance that would constitute a competing explanation, provide grounds for concluding that recent changes in the age distribution are almost certainly due to the policy reforms that brought a new outlook for dairying, characterised by greater market uncertainty and the perception of higher risk in the sector.

This aspect of restructuring needs greater attention. High quit rates and lower recruitment to the sector permit farm growth and the herd expansion of established, ongoing dairy enterprises, which enable economies of scale to be realised. However, the age of those quitting, and the failure to recruit young dairy farmers, can have negative consequences for the performance of the sector in the future. In a more market-oriented environment, the qualities usually associated (perhaps without real justification) with younger entrepreneurs will be needed more than in the past.

13.7 Simplification of policies and administrative procedures

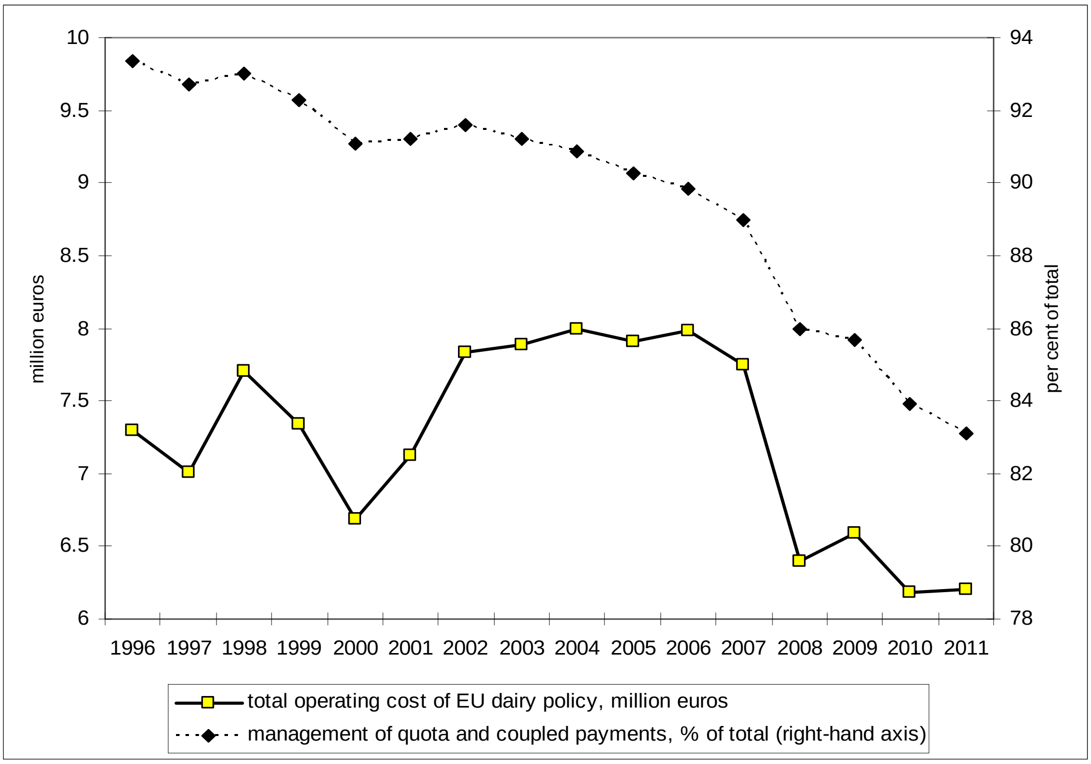
The CAP legislation relating to the dairy sector was simplified in a number of respects during the period under evaluation. Specifically, the target price for milk was abolished (Reg 1787/2003), the distinction between milk deliveries and direct sales off milk and milk products off farms was simplified (Reg 1788/2003), various rules relating to Member States' management of quotas were rationalised to bring greater flexibility (Reg 1782/2003), the dairy premium was merged with the Single Farm Payment (between 2005 and 2007), the intervention system was scaled down, and various existing regulations on aid to special categories of butter, concentrated butter and cream consumption were repealed and replaced with a new regulation (Reg 1898/2005) in the interests of harmonisation between products or because they had not been used for some time. At the same time, on-farm inspection costs for cross compliance have undoubtedly risen, but the costs of monitoring dairy farmers' compliance will not be registered under the heading 'dairy', but rather under general CAP administration costs.

The expected impacts of these changes (apart from their direct policy impacts) are lower budget costs and/or policy transaction costs, better understanding of the policy package by stakeholders and greater flexibility at Member State level. Therefore, it should be examined whether these objectives were achieved, in particular whether the costs of administering the CAP were reduced, and whether stakeholders were aware of a simplification in their policy environment. It is also relevant to evaluate the choice and the timing of the changes undertaken with this objective. In some cases, it may be asked whether changes made in the name of 'simplification' resulted in budget or administrative savings being outweighed by extra costs borne by producers or consumers.

In general, it was impossible to obtain information from public administrations (DG AGRI or Member State ministries) on the administrative cost of EU dairy policies, or their perception of trends in this cost. Similarly, the perception of public administrators on the degree to which administration may have been simplified was not obtainable. Information has been received regarding administration costs from two Member States: the Netherlands and Germany. The following paragraphs summarise the findings.

Expenditure estimates obtained from several sources by the Dutch Landbouw Economisch Institut (LEI) fill a small part of this information gap. The evolution of expenditure on operating EU dairy policy in the Netherlands is shown in Figure 13.15. The costs of operating import controls and of administering the SFP, are not included in these figures. Total expenditure varied between €6 million and €8 million during the period 1996 to 2011, with the highest costs arising in the period 2004-2006. The largest share of the expenditure goes on the administration of the quota scheme, including quota trade, and coupled payments. The sharp fall in 2008 is in fact largely due to the decoupling of the dairy premium after which the administrative costs of delivering direct payments to Dutch dairy farmers no longer show up in the administrative budget for dairy. The suspension of export refunds during 2007-2008 also played a role in this fall. The share of this large item in total expenditure fell from around 93% to 83% over the period. The other items of expenditure and their shares of the total in 2010 were the cost of managing the intervention system (13%), administration of quality regulations (12%) and management overheads (6%). These other items were growing at a rate of about 5% per year over the period.

Figure 13.15 Expenditure on operation of EU dairy policy in the Netherlands, 1996-2011



Source: data compiled by LEI.

The estimated administrative cost per tonne of milk supplied to the market was about 0.61 cents/t at the start of the decade, rose to well over 0.70 cents/t in the middle part of the decade and finished in 2010 at about 0.55 cents/t. This is the experience of one Member State and should not be generalised to others, or to the EU as a whole. However, it is indicative of what could be expected.

Administration of dairy policy in Germany is shared among three national public entities: the Federal Ministry for Food, Agriculture and Consumer Protection (BMELV), the Federal Agency for Agriculture and Food (BLE))) and the Federal Ministry of Finance (BMF), and various state-level administrations and agencies. The first of these bodies is responsible for legislation, assistance in legal disputes and reporting, the second takes care of public and private storage, statistical collection and reporting, and trade licences, and the third is responsible for regulations pertaining to trade and milk quotas. Various bodies at the level of the Länder (federal states) are responsible for the implementation of the milk quota regulations and the school milk programme.[96]

In 2009, the total number of person-days required for dairy policy administration in Germany was 172, at a cost of €625,280, of which 3% was incurred by BMELV, 26% by BLE, 21% by BMF and 51% by

[96] Agricultural agencies, the chambers of agriculture, state administrations and other state-level bodies. The figures quoted in the text for the costs at provincial level are based on estimates for the state of Nordrhein-Westfalen.

state-level entities. This amounts to about 2.2 cents per tonne of milk supplied.[97] In 2010, there were considerable savings relative to 2009 because no storage subsidies or export refunds were paid so the time spent on administration fell to 141 person-days (-18%) and the total cost was €522,693 (-16.4%). The administrative savings under these two headings were €72,707 and €39,990, respectively. All the savings from the non-use of these measures accrued to BE and BMF, so that the shares of the smaller total expenditure borne by the different organisations were then 4% (BMELV), 16% (BLE), 18% (BMF) and 62% (state bodies). The time-cost of the on-going administrative tasks remained constant in person-days, but the financial costs increased slightly due to inflation. This evidence provides some orders of magnitude concerning the administrative cost of different types of dairy measure. The abolition of most private storage implies that the corresponding administrative cost savings will be permanent, whereas the use of public intervention and export refunds can be resumed and costs can be expected to rise again as a result. The evidence supports the more general conclusion that the abolition or suspension of a specific type of policy measure can result in administrative savings. It is inconclusive on whether simplifications in on-going measures (with the aim, for example, of making them more easily understood by farmers) result in any appreciable saving in the cost of administering them.

It is also relevant to consider whether the 2003 policy reform brought savings in the administrative burden borne by other stakeholders. The milk producer questionnaire asked respondents how many hours they spent on administrative tasks in 2010 due to EU policy requirements, and whether there had been an increase in this time commitment since 2003. The average time spent per farm was 185 hours per year, but the range was very wide. An increase in time for administration was reported by 65% of respondents, no change by 29% and a decrease by 6%.

Most farmer respondents whose policy-related administrative workload increased gave a least one reason for it. Non-specific causes (like "more bureaucracy", "it is more complicated") were cited by 38% of respondents. Environmental regulations (especially arising from cross compliance, keeping fertiliser records and so on) were given in 22% of cases, a larger total number of regulations in 15% of cases, paperwork arising from cattle movements, cattle registration, veterinary and other hygiene regulations in 14% of cases, and 'other reasons' (as diverse as more on-farm certification processes and investment in renewable energy production) in 6% of cases. The switch to the SFP and expansion or restructuring of the farm accounted for 3% each. A recurrent comment was that the increased time spent on administration was partly because greater care was needed in order to maximise payments or to avoid inaccuracies that could lead to a farm inspection. The much smaller number of farmers reporting a decrease in time spent on policy-related administration often gave computerisation of their record-keeping as the reason, along with the use of dedicated software or special databases. Another factor occasionally mentioned was their growing familiarity with the tasks and, in a few cases, the outsourcing of part of the administrative burden to experts.

A similar question was also asked in the processors' survey. Here, the reported time commitments varied enormously with the size and specific activities of the company and, one assumes, also with the respondents' interpretation of the question. Answers were given in terms of hours per year or per month, or the number of full-time employees assigned to the task. Given this diversity, and also because of the non-randomness and small size of the sample selected, we make no attempt to find an average or central value for this variable. What is more interesting for the purposes of this evaluation is whether respondents thought there had been a change in the time taken by policy-related administrative requirements. The proportions of processor respondents falling into the three categories (increase, no change and decrease) are very different from those of the farmer respondents when asked the same question. Half the processors' representatives considered there had been no change, whilst the others were divided equally between those who thought it had increased and those who perceived it as being lower. Among those reporting an increase in administrative time due to EU policies, non-specific reasons (more burdensome in general) were most often given, just as among the farmers. Other more specific reasons were (local) increases in quota mobility, traceability requirements and other quality issues. Those who thought the administrative burden had become lower attributed it to there being fewer instruments, less bureaucracy in general and to the suspension of export refunds (implying that this policy measure does impose an administrative burden when in normal operation).

[97] Comparison with the figure per tonne calculated for the Netherlands should be avoided, as the items included under administration costs are not standardised and the methodologies for estimating the costs differ.

The survey among administrators and experts shed very little light on this question. One respondent characterised the administrative burden imposed by EU policy on food producers and processors as the price to be paid for the competitive advantage of the EU "brand" in terms of quality and food safety.

In conclusion, it is true that some policy measures and procedures have been simplified or discontinued. The evidence obtained from two member States on the costs to public administrations due to dairy policy suggests that the total cost of administering dairy policies has been stabilised in those two Member States, and has been responsive to the abolition/suspension or scaling down of specific policy measures. At the same time, the general trend towards more complex and more targeted policies continues. The introduction in the 2003 reform of cross compliance for farmers as a condition for receiving direct income payments coincided with the more market-level policy simplifications described above. It is not surprising that milk producers have a different perspective on the issue of policy simplification than either administrators or processors. Policies are evolving and becoming more targeted. Therefore, simplification and rationalisation of existing policies should be a permanent aim accompanying this trend, so that the total policy burden on any group of stakeholders should not increase or, more optimistically, should be reduced.

13.8 Conclusions

The overall conclusion is that the efficiency of CAP dairy policy has improved since the 2003 reform. This conclusion is stronger if the fall in 'consumer transfers' to producers is taken into account along with the direct budget costs of the policies.

Where efficiency gains in budget expenditure are concerned, the beneficiaries are taxpayers, or those citizens who benefit from programmes that these budget saving are used to fund. Regarding savings in consumer transfers, however, the beneficiaries are not so easily identified. The question is whether final consumers actually benefit in full from the fall in milk prices and wholesale prices of dairy products (i.e. the smaller 'consumer transfer'), or whether some of these efficiency gains are absorbed somewhere else in the chain. This question lies outside the remit of the present evaluation. It is, however, extremely pertinent to an overall cost-benefit assessment of these policy changes.

Table 13.11 summarises the findings of this evaluation question. The major policy changes can be classified above the rising diagonal, which indicates efficiency improvement. The last cell in the first column indicates improved attainment of an objective but at higher cost. These costs, however, fall outside the budget for dairy policy *per se* since they relate to the SFP generally.

Table 13.11 Classification of the range of judgements

	Level of attainment of objective		
Cost	**Improvement**	**No change**	**Deterioration**
Decreasing	**Market balance** (disposal aids, export refunds) **Policy simplification** (administration costs) – **verified in two Member States only**	**Producer income level** (budget costs of dairy policy much lower, but the saving is much smaller if the cost of the ex-dairy premium is also considered)	**Price stability** (intervention costs lower)
No change	**Market orientation** **Structural change** (These items have no direct costs, but benefit from changes shown elsewhere in the table)	**Competitiveness** (no conclusive evidence found that milk or dairy products had become more competitive)	
Increasing	**Environmental standards** (farmer administration costs, monitoring costs for cross compliance)		

14 EQ10: Coherence

EQ 10.1: To what extent have the CAP measures applicable to the dairy sector been coherent with the rural development measures and the national aid granted in accordance with the relevant EU rules on state aid?

EQ 10.2: To what extent have the CAP measures applicable to the dairy sector after the 2003 CAP reform been coherent with the overall concept and principles of the 2003 reform of the CAP?

14.1 Interpretation and comprehension of the key terms of EQ10

Coherence is defined as "The extent to which complementarity or synergy can be found within a programme and in relation to other programmes. The internal coherence refers to the correspondence between the resources allocated to a programme and its objectives. The external coherence refers to the adequacy between the evaluated programme and other related programmes".[98] The way the questions are posed, and the explicit references to rural development (RD) measures, state aid (aid provided at Member-State level) and the overall principles of the 2003 reform, leads us to interpret 'coherence' as external coherence, i.e. the compatibility of EU dairy measures with these other separately formulated although related policy frameworks.

14.2 EQ10.1: Coherence with rural development measures

This question analyses the extent to which the CAP measures applicable to the dairy sector have been consistent with the RD measures and the state aids granted in accordance with relevant EU rules. It focuses on whether and if so how, dairy policy interventions work in the same direction as, or at least do not contradict, rural development policy interventions that may also impinge on dairy farmers, on regions where dairying is undertaken or on structural change in the dairy sector, including the rate of exits. It must be stressed that rural development policies are very largely horizontal policies that do not target any specific commodity sector, whereas dairy policy by definition aims to affect decisions and outcomes for those producing, processing or trading milk and dairy products. Therefore, there is no direct match between measures within the two sets of policies. However, it is possible to identify the incidence of RD payments by type of farm, and evidence on this is provided.

As a generalisation, dairy policy within the CAP focuses on market management and impacts on dairy farmers in their role as producers and suppliers of milk to the market, whereas the first two axes of rural development policy take a more farm-level approach, viewing farmers as managers of fixed natural resources and farm capital. However, at a higher, more general level of impacts, there is overlap between certain objectives, especially *economic viability* (of the dairy sector, in one case, of the rural economy including farming, on the other) and *sustainability*. It may also be asked whether certain global impacts might be achieved better by sectoral (i.e. commodity-specific) policies or horizontal policies.

14.2.1 Methodology used for answering EQ10.1: coherence with RD measures

In a first stage to evaluating this question, the types of measures listed in the Rural Development Regulation (RDR) are examined at a conceptual level for potential conflicts and synergies with the objectives or instruments of CAP dairy policy, and likewise the objectives and instruments of dairy policy are examined to identify potential synergies and conflicts with those of RD policy. State aid schemes are identified according to objective, and a conceptual analysis is made of their coherence with the objectives of CAP dairy policy.

[98] "Handbook on Common Monitoring and Evaluation Framework Guidance Document" (DG AGRI, 2006) Glossary (p.2).

At the ex post stage of the analysis, problems of heterogeneity and complexity arise. The RDR (EC 1698/2005) defines the *headings* under which Member States may opt to design and implement policies. However, not all Member States opt for all types of measure, and the specific measures adopted are (intentionally) quite region-specific. This is fully in line with the principle of subsidiarity that motivates Pillar 2, and is intended to improve the efficiency of Pillar 2 measures. However, it means that precise empirical analysis of the interactions between specific RD measures and CAP dairy policy would have to be conducted at a detailed level. Therefore, no attempt will be made to investigate interactions between specific RD measures and dairy policy. Instead, the approach taken to this question is to examine to what extent dairy policies under Pillar 1 of the CAP have contributed to the main aims of the Rural Development Programme.

This approach gives rise to the ex post indicators set out in Table 14.1. In most cases (except those relying on the own survey, where a single 'snapshot' will be presented), *trends* in these indicators over the evaluation period will be shown, or (where data do not permit this), a comparison between a period closely before the 2003 CAP reform and the later part of the evaluation period.

14.2.2 Judgement criteria, indicators and information sources used for each indicator

Table 14.1 Judgement criteria and indicators for EQ10.1

Indicator	Data requirement	Information sources
Economic viability		
▪ *Economic viability of dairying*		
Evolution of farm profitability over time	Farm income data (at MS and case study level)	EU-FADN
Changes in gross margins	Data on farm revenues and (variable) costs (at MS and case study level)	EU-FADN
Share of specialist dairy farms having a non-negative income	To be calculated from EU-FADN data	EU-FADN
▪ *Contribution of dairy farming to the rural economy*		
Integration of dairy farms in the local economy	Other economic activities by dairy farmers and spouses	Producer survey
Rural employment		
Number of dairy farms	Data on dairy farm holdings	EU-FADN and Eurostat (FSS)
Number of AWE related to dairy	Data on own and external labour input in dairying	EU-FADN
Impact of dairy policy on continuation of dairying	Importance of various policy instruments for producer's decision to stay in dairy farming	Producer Survey
Support for modernisation and investment		
Use of higher milk revenues for farm investment	Frequency of positive responses to this question	Producer Survey
State aid provided to dairy farmers	Quantitative and qualitative data about state aid given to or received by farmers	Producer Survey
State aid provided to dairy processors	Quantitative and qualitative data about state aid given to or received by dairy processors	Processor Survey
Contribution to/constraints from sustainability		
Receipt of Pillar 2 agri-environmental payments	Frequency of positive response to this question	Producer Survey
Compatibility between production plans and environmental restrictions	Frequency of producers who have not expanded their herd more since 2003 due to environmental restrictions	Producer Survey
Organic milk production	Trend in production of organic milk	Eurostat

14.3 Ex ante analysis of EQ10.1

The period for this evaluation spans two Rural Development Programmes: the 2000-2006 Programme, laid down in Council Regulation (EC) No 1257/1999 and the 2007-2013 Programme is set out in Council Regulation (EC) No 1698/2005. The state aids to be considered are the 22 aid schemes relating to the dairy sector that are registered with the Commission by 11 Member States for some part of the evaluation period. They are listed in Table 2.44. These three sets of legislation will be compared, first in terms of their aims and areas of focus, and second (more selectively) in terms of specific measures.

The main objectives of the CAP policies for dairy are market balance, market and price stability, the income of milk producers, the competitiveness and market orientation of the dairy sector, and production structures and structural change. The objectives of rural development policy are more heterogeneous and more diffuse, but can nevertheless be summarised under several main themes. In Regulation 1257/1999, these objectives are articulated as follows:

- the improvement of structures in agricultural holdings and structures for the processing and marketing of agricultural products,
- the conversion and reorientation of agricultural production potential, the introduction of new technologies and the improvement of product quality,
- the encouragement of non-food production,
- sustainable forest development,
- the diversification of activities with the aim of complementary or alternative activities,
- the maintenance and reinforcement of viable social fabric in rural areas,
- the development of economic activities and the maintenance and creation of employment with the aim of ensuring a better exploitation of existing inherent potential,
- the improvement of working and living conditions,
- the maintenance and promotion of low-input farming systems,
- the preservation and promotion of a high nature value and a sustainable agriculture respecting environmental requirements,
- the removal of inequalities and the promotion of equal opportunities for men and women.

In Regulation 1698/2005, most of these aims reappear, together with some new ones, as do most of the more specific objectives and descriptions of measures. They are, however, now grouped under four 'axes': Axis 1 has as its aim to improve the competitiveness of the agricultural and forestry sector, Axis 2 to improve the environment and the countryside, Axis 3 looks beyond the farm to target the quality of life in rural areas and the diversification of the rural economy, while Axis 4 aims to promote local or grass roots initiatives and associations proposing an integrated rural development strategy (Leader initiatives). The first two axes are more relevant to the following discussion.

The state aid schemes under consideration include 12 schemes relating to serious cattle diseases (eradication, monitoring and/or compensation), 5 schemes supporting organisations concerned with breeding and improving the genetics of the national herd, 2 schemes relating to the marketing of agricultural products[99], one to improve on-farm storage of milk[100], one supporting cessation of livestock production, and one supporting production and pro mille (land-tax) funds. These are nearly all areas where EU legislation and programmes exist. Indeed, the two schemes described in the footnotes, in objective although perhaps not in the specific of their operation, fit well with Axis 1of the RDP. However, it can be inferred from their description that these aid schemes have been set up in response to nationally or locally specific needs, and are more logically pursued at that level. Seven of the 11 Member States, and 15 of the 22 schemes, involve New Member States.

There is one common theme across the three sets of legislation, and that is the aim of improving competitiveness. However, whereas the CAP dairy measures focus largely on the competitiveness of markets and market functioning, the RD emphasis is on the competitiveness of individual holdings and farming operations through modernisation and improving structure and resource use at farm level, and the state aid schemes aim to increase competitiveness by supporting the catching up of national

[99] N108/2010 (Bulgaria): State aid under the Temporary Framework to agricultural holdings active in primary production, processing and marketing of agricultural products.
[100] N90/210 (Bulgaria): Investment aid to agricultural holdings to meet the quality requirements on the production and storage of raw milk laid down in Regulation (EC) 853/2004.

standards with wider EU standards (particularly as regards animal health and genetics). Thus, regarding the aim of competitiveness, the three approaches are fully compatible and potentially synergistic. The state aid schemes appear to fill gaps where specific local needs are not met by either of the CAP pillars.

Until the 2003 CAP reform, EU dairy policy focused very largely on market management measures (border measures, intervention, disposal aids and so on). The only major dairy measure to impinge directly on farms was the milk quota regime, which – although in design a market management tool – could only function rationally if it distributed the responsibility for market supply control over individual producers. Clearly, there is little in the way of synergy between this measure and the farm-focused measures eligible for the RDP. However, neither is there lack of coherence, since the aims and specific measures targeting farms under Axes 1 and 2 are just as relevant in a context of supply control, and perhaps more so.

The 2003 legislation, by creating the dairy premium and attaching to it the same environmental cross compliance requirements for individual producers as in the other agricultural commodity sectors, brought part of the focus of dairy policy under Pillar 1 closer to that of Pillar 2. It is in the areas of environmental protection and sustainability that one must examine the question of coherence most closely, and where there is a greater likelihood of finding potential conflicts. Indeed, one might ask whether the potential conflicts might be more properly described as internal to Pillar 1 rather than as between CAP dairy policy and RD.

A potential dilemma is that, in promoting greater economic efficiency and market orientation, dairy policy measures may create incentives that do not give much weight to "non-market" costs and benefits, which are at the heart of "environmental accounting". It is precisely to balance this tendency that the cross compliance requirements within Pillar 1 are needed, as is the strong environmental axis within Pillar 2. If this construction works well, the two pillars will be self-balancing so that market orientation and greater efficiency can be pursued in an environmentally sustainable way.

However, the cross compliance requirements apply to individual farm practices and leave out a number of factors that are targeted in the RD legislation. One example concerns the geographical location of milk production. The support of sustainable farming in less favoured areas (which helps to maintain the environmental benefits due to low-intensity livestock production) is an objective of rural development policy in both the previous and the current programme, yet evidence reviewed in EQ1 of this report suggests that market orientation incentives are putting pressure on dairy production to leave some LFA locations despite this support. Another example concerns the quality and continuity of the dairy workforce and the renewal of human capital, whose benefits are recognised in the RD Programmes. Both Programmes contain measures for supporting the setting up of new entrants, and for the early retirement of farmers who are 55 year of age or older. These are not social programmes – they come under the heading "Investment in Agricultural Holdings" in the 2000-2006 Programme, and within Axis 1 (Competitiveness) in the 2007-2013 Programme, and thus acknowledge the importance of young farmers as a productive resource. However, EQ9 shows that the exposure of the dairy sector to stronger market forces in recent years may have −at least temporarily− dissuaded young farmers from taking up dairying at rates similar to the past, and that the age structure is shifting towards older age groups. These two examples illustrate areas where potentially self-balancing measures are not in place.

Cross compliance requirements that aim to promote environmentally respectful farm practices, for which individual farmers can be held to account, are obviously not able to keep in check either of tendencies just described or to ensure that the two RD objectives concerned are not dominated by market-orientated incentives. At the worst, the two sets of incentives will come into conflict, and RD funds will be spent to counteract the fall-out, or even some of the desired impacts, of dairy policy measures. More optimistically the two pillars will keep each other in check. The regionally-specific nature of RD policies is an advantage here: implicit "zoning" may enable highly market-oriented farms to develop with relatively few constraints in areas where the opportunity cost in terms of rural development values is low, whilst these values are preserved in areas where they can be achieved at lower cost in terms of production and economic competitiveness. How much public support there would be for this kind of solution is not known.

It is worth noting two specific RDP initiatives that could be potentially beneficial to the dairy sector by filling gaps left by EU dairy policy. They are, first, the measure 'Producer groups' with its objective "to facilitate the setting up and administrative operation of producer groups for the purposes of (a) adapting the production and output of … members of such groups to market requirements; (b) jointly placing goods on the market, including preparation for sale, centralisation of sales and supply to bulk buyers; (c) establishing common rules on production information, with particular regard to harvesting and availability" (Regulation 1698/2005, Article 35)[101], and the measure 'Cooperation for development of new products, processes and technologies in the agricultural and food sector', which aims "to promote the cooperation between primary producers in agriculture and forestry, the processing industry and/or third parties" with a view to developing new products, processes and technologies (Regulation 1698/2005, Article 29). These two initiatives – to promote cooperation between producers and other segments in the chain to facilitate the organisation of producer market power – are very pertinent to the dairy sector. Recent public discussion has emphasised the need to improve the functioning of the dairy supply chain as a whole, and to move away from its characterisation as a set of mutually antagonistic segments who tolerate each other while aiming to maximise their own self-interest. Although the RD measures will be "small" and may only be taken up by Member States where the climate is already conducive to success, it will be interesting to see whether initiatives emerge within the RDP that could lead the way towards more generalised institutional structures and solutions to what is currently an unsolved problem.

In conclusion, the state aids examined are small in scope and seem highly complementary to both the CAP measures for dairy and rural development measures. The coherence between CAP dairy measures and RD measures is potentially high, with room for complementarity and some scope for synergies. Nevertheless, there are areas where the two pillars could find themselves at cross purposes.

14.4 Ex post analysis of EQ10.1

This section assembles some empirical evidence on how CAP dairy measures have contributed to rural development goals and vice versa.

14.4.1 Economic viability

Tables 7.3 and 7.4 show that, after a few years without growth at the start of the decade, Farm Net Value-added per Annual Work Unit (FNVA/AWU) (both for specialist dairy farms and for non-specialist dairy farms with a dairy herd) has maintained a strong positive trend from 2004 onwards. This picture is confirmed by the figures for Family Farm Income per Family Work Unit in Table 7.5 (perhaps a better indicator of what can be spent by farming families while keeping the productive capacity of the farm constant), and this trend is particularly strong for the Member States of EU-10, although not for all new entrant Member States. Thus, the contribution of the milk-producing sector to rural income generation has become healthier, and as already concluded, this can be attributed to CAP dairy policies.

The data in Table 7.9 on gross margins for specialist dairy farms shows that, for EU-15, this indicator has regained its 2000 level, after being somewhat lower for some of the intervening years, and has increased considerably at EU-10 level. This indicator is useful because it shows family farm income before the deduction of depreciation (the imputed cost of maintaining the same of level of farm investments over the longer-term). Given the flexible nature of investment decisions, which can be postponed in difficult times, it is a useful indicator of resilience in the short-term, and the ability of farms to withstand the impact of a few bad years.

A comparison of Tables 7.3 and 7.4 indicates that average FNV/AWU is consistently higher on specialist dairy farms than on farms with dairy herds that are not specialised in milk production. However, these are Member State averages and do not indicate how much the income of individual specialist dairy farms varies around the average.

Table 14.2 shows that the proportion of specialist dairy farms that earn a positive net economic profit (that is, Farm Net Value Added minus the returns to all family-owned productive resource including family labour) varies greatly between the Member States of EU-15, and to a lesser extent between EU-10 Member States. This income definition is very informative about the long-run survival potential of the farm. In the shorter term, the farmer and his family may be willing to accept non-economic returns on their family-owned assets (particularly if these assets are rather dairy-specific and not easily shifted to

[101] A similar measure was already offered in the previous RDP, see Regulation 1257/1999, Title V.

another economic use), but in the long run a persistent negative net economic profit will drive operators out of the sector. It is noticeable that this indicator is highest in Spain, Portugal and Greece (countries with lower average income), and lowest in Finland and Sweden (high-income countries).

Table 14.2 Share of specialist dairy farms with positive net economic profit, 2000-2007

	2000	2001	2002	2003	2004	2005	2006	2007
Belgium	0.54	0.60	0.49	0.55	0.54	0.65	0.69	0.77
Denmark	0.16	0.08	0.12	0.12	0.10	0.19	0.28	0.46
Germany	0.22	0.22	0.18	0.17	0.33	0.43	0.44	0.65
Greece	0.45	0.46	0.54	0.57	0.73	0.85	0.83	0.92
Spain	0.53	0.67	0.65	0.65	0.55	0.61	0.61	0.59
France	0.33	0.34	0.46	0.40	0.43	0.48	0.45	0.54
Ireland	0.36	0.37	0.36	0.43	0.40	0.42	0.31	0.47
Italy	0.31	0.32	0.33	0.30	0.33	0.39	0.36	0.43
Luxembourg	0.49	0.55	0.42	0.54	0.57	0.67	0.57	0.71
Netherlands	0.32	0.37	0.33	0.29	0.30	0.43	0.40	0.57
Austria	0.26	0.34	0.30	0.20	0.26	0.34	0.34	0.41
Portugal	0.28	0.40	0.48	0.46	0.54	0.54	0.71	0.63
Finland	0.16	0.23	0.23	0.22	0.16	0.18	0.13	0.20
Sweden	0.05	0.05	0.08	0.08		0.07	0.08	0.18
United Kingdom	0.20	0.38	0.21	0.29	0.32	0.38	0.36	0.57
EU-15	0.30	0.34	0.34	0.32	0.37	0.44	0.43	0.53
Czech Republic					0.39	0.34	0.37	0.55
Estonia					0.48	0.40	0.33	0.43
Hungary					0.47	0.23	0.36	0.30
Lithuania					0.70	0.53	0.46	0.45
Latvia					0.44	0.52	0.43	0.45
Malta								
Poland					0.26	0.26	0.29	0.33
Slovakia					0.52	0.37	0.18	0.39
Slovenia					0.27	0.14	0.14	0.22
EU-10					0.30	0.28	0.30	0.35
Bulgaria								0.67
Romania								0.20
EU-02								0.24

Source: EU-FADN.

Dairy farmers are also involved in other income-generating activities. Over 70% of the respondents to the producer survey had household revenue from productive activities apart from the sale of milk. About 30% had revenues from crop production, 15% from beef or other livestock activities. Nearly 15% were producing renewable energies, including biogas, whilst over 3% were involved in farm tourism, and smaller proportions were involved in direct selling of milk and farmhouse cheese, vineyards and forestry. The receipt of off-farm transfer payments (e.g. pensions) and spouse's income were mentioned by under 10% of respondents. Despite the statistical non-representativeness of this survey, it gives a snapshot of other kinds of economic activities undertaken by dairy households that contribute to rural development. In so doing, it reinforces the conclusion that policies for maintaining a thriving and active dairy activity in a region contribute to its economic development.

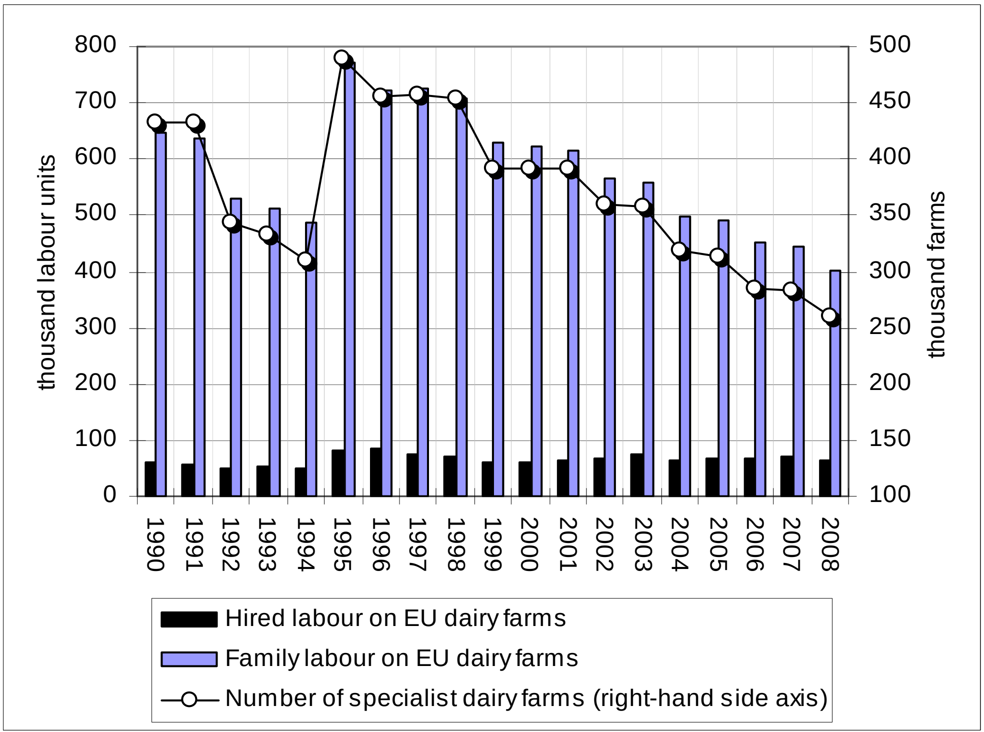
14.4.2 Rural employment

Rural employment is considered an aim of rural development in its own right, since by keeping rural workers and their families in the countryside it helps to maintain viable population centres and networks of sufficient population density to sustain basic services (schools, health and transport services, and so on). Here we explicitly address the issue of the number of workers involved in dairying in Europe.

Figure 14.1 shows the trends in annual work units on EU specialist dairy farms between 1990 and 2008. Up to and including 1994, the figures are for EU-12, and thereafter for EU-15. It is clear that the majority of dairy labour is family labour, although the proportions of family and hired labour vary considerably between Member States. In 2008, the average family labour per farm was 1.54 units in EU-15 and 1.71 units in EU-10, whereas for hired labour the coefficients are 0.25 units per farm for EU-15 and 0.39 for EU-10. In EU-15, the highest rate of family labour per specialist dairy farm is in Finland (1.83) and the lowest in Denmark (1.25), whilst the extremes for hired labour are found in Denmark (1.04) and the UK (0.89) on the one hand, and in Belgium (0.02) and Spain (0.1) on the other hand. The herd numbers in the figure relate to specialist dairy herds only, but non-specialist dairy herds are likely to tell a similar story.

It is clear that dairy labour has been falling faster than the number of herds, due to economies of labour use with herd size expansion. What cannot be ascertained from these figures is whether the number of local jobs off farms related to or depending on dairying has been increasing, with more outsourcing of tasks.

Figure 14.1 Labour on farms with dairy herds, EU-15, 1990-2008



Source: EU-FADN.

The total contribution made by agriculture to the local economy is reduced if dairy farmers quit and are replaced by other types of farm that generate less employment (for example, crop farms). In regions where dairying is the only viable agricultural activity and is not replaced by other farming types, cessation of dairy activity is even more serious for rural depopulation. As reported in Table 5.6, low milk prices were the most important reason given by respondents to the producers' survey as to why they had considered giving up in recent years. That response was almost certainly coloured by the experience of the low milk prices of 2009 and needs to be put in the perspective of upward-trending dairy farm income statistics. The producer survey also asked producers whether the planned increases in quota were a factor that encouraged them to remain in dairying, and if so how important it was. Nearly 22% said it was a positive incentive to remain in dairying, and for 7% it was a very positive incentive. These results show that the dairy policy changes under review are working to slow down the exodus from dairying and thereby enhance the objectives of rural development.

14.4.3 Support for modernisation and investment

The timing of farm investment and how to finance it are important decisions for farmers. The two Rural Development Programmes within the evaluation period both have provision for various investment aids targeted to the modernisation of equipment and structures, or a strategic change in production technology.[102]

In order to gain some insight into how dependent dairy farmers are on regular income for meeting their investment needs, the respondents in the producer survey were asked what they did with the extra windfall revenue earned during the period of high prices in 2007-2008. Nearly one respondent in four (23%) claimed not to have received higher prices during that time. Of the remainder, a majority ploughed the higher revenue back into the business (although a few reported using it for family or personal expenditure). Table 14.3 summarises the frequency with which respondents used the extra revenue for various purposes.

Table 14.3 Use of extra revenue during the high-price period of 2007-2008

Use of extra revenue	Not used at all for this	Used for this to some extent	Used for this to a great extent
	% of those who received a higher price		
Investment in			
Repairs/replacements to milk equipment	36.1	42.4	21.5
Expansion of fixed technical capacity	60.9	22.1	17.1
Herd expansion	65.9	25.8	8.3
Quota purchase	66.2	25.8	7.9
Financial adjustment			
Reduce debt	45.8	34.2	19.9
Increase savings	60.6	29.8	9.6

Source: Producer survey.

Nearly two-thirds of these respondents used the extra revenue to some extent for replacing or repairing equipment used for milk production, whereas only about one-third used the money for investing in expansion of one kind or another. Over half of the respondents used the money to reduce their debt, which in the typical case represents loans for past investment. These results, together with evidence cited in EQ3 and in Figure 14.1 of the negative profitability of a large share of milk producers in normal times, indicate that additional revenue and investment grants may well facilitate investment that otherwise could not be undertaken in periods characterised by average prices.[103] Thus, the rural development aids supplement to an extent the income support coming from Pillar 1, whilst at the same time favouring particular investment priorities that are deemed to be beneficial for the sector.

Finally, respondents to the milk processors survey were asked specifically about their perception of the impact of state investment aids. Well over half of them thought they had no impact on market stability, although the remainder perceived an impact, About half of all respondents reported that state aids had affected the structural development of their company, and the same number considered that they had a positive effect on their competitiveness. In fact, 12 respondents singled out state aids as one of the three most important factors in improving their competitiveness. In some cases, this involved improvements in their own operations, in others it was because state aids improved the performance of milk producers in their region. This is weak but interesting evidence in favour of synergies between the impact of state aids, on the one hand, and the objectives of both pillars of the CAP.

14.4.4 Measures to enhance environmental sustainability

Since 2004, environmental objectives have been associated with direct payments received by milk producers through the accompanying cross compliance requirements. The question arises as to whether the cross compliance provisions under Pillar 1 and the agri-environmental measures in the RDP in practice act in a complementary fashion, or whether cross-compliance requirements have in part

[102] In the 2000-2006 Rural Development Programme, over 71 thousand dairy farms in EU-25 received €6.946 billion of total public (EU and Member State) expenditure on Axis 1 schemes. This axis covers farm modernisation and other activities improving the competitiveness of farming.

[103] It is interesting to note that when asked what had been important or very important factors for keeping them in milk production since 2003, around two-thirds specified both having made recent investments and receiving direct payments, whereas 85% cited receiving sufficient revenue to cover production costs as a decisive factor. State aid was mentioned by relatively few, and not many respondents received it.

substituted for the (voluntary) measures available in Pillar 2. Table 2.51 shows that, from 2000 onwards, the share of dairy farms relative to all types of farm as recipients of total Pillar 2 payments (all four axes) has remained rather constant or has increased, and in at least nine Member States of EU-15, the size of the payments per farm is higher than the average for all types of farm. There are large differences between these payments per farm between Member States. It should be borne in mind that these differences depend in part on Member State decisions as to which RD measures to adopt, and the scale at which to operate them.[104]

Table 14.4 summarises the responses of the 393 survey respondents to the question on how important the direct payments concerned are for enabling them to continue in milk production. It shows that the various direct payments (Pillar 1 and Pillar 2) are used extensively and in combination by a majority of the producers, and that these payments are considered individually to be important by those receiving them for their decision to remain in milk production. The Single Farm Payment (or Single Area Payment in Latvia and Poland) was considered "more" or "very" important for maintaining milk production by about 60% of all those (nearly everyone) receiving it. A greater share of LFA producers (62.6%) gave this rating to the SFP/SAP than to LFA payments (54.5%). Here, a Pillar 1 policy (although since decoupling it is no long a dairy measure) is clearly contributing to a Pillar 2 objective.

It is noticeable that more than 70% of LFA producers also received agri-environmental payments (as against 55.5% for the sample as a whole). This does not reflect a marked difference in farming activities between LFA and non-LFA producers, since the degree of income diversification of LFA producers was almost identical to that of the sample as a whole.[105] Instead, it probably reflects the lower comparative advantage of LFA milk producers, and their greater opportunities for producing environmental services. About 2% of respondents received other environmental payments (most funded from other EU programmes, several forestry premiums, another two grassland premiums from the provincial government).

Table 14.4 Importance of direct payments to milk producers for staying in milk production

Type of payment	Share that receives the payment	Importance of the payment for staying in production				
		Not important at all	Less important	Important	More important	Very important
	% of total	% of those receiving the payment				
SFP/SAP	97.2	1.8	8.6	29.3	19.3	39.8
Agri-environmental	55.5	10.4	17.1	31.1	16.2	23.9
LFA	42.0	7.3	9.1	28.5	13.9	40.6
LFA payment recipients only						
SFP/SAP	98.2	2.3	7.0	25.7	16.4	46.2
Agri-environmental	70.2	9.4	7.6	17.5	11.1	24.0

Source: Producer survey.

The degree of importance given to agri-environmental payments by those receiving them indicates that rather than being a constraint on the size of the milk sector, producing agri-environmental goods has a positive impact on keeping producers in the milk sector. In the same survey, however, producers ranked environmental regulations as the second most important reason why they had considered quitting since 2003 (see EQ1), and that environmental regulations were given by more than one respondent in five as a reason for their perception of a higher administrative burden (EQ9). Moreover, 12% gave environmental regulations as a reason for not expanding their herd size as much as they would have wished since 2003.

An underlying principle of Pillar 2 payments is that they should compensate producers for costs incurred or income foregone by complying with any RD scheme. Although cross compliance has been a condition

[104] Summary statistics on RDP payments to the milk sector under the two programmes. To be added.
[105] For around 58%, more than 75% of farm income (excluding direct payments) came from milk, and for a further 31-32% it was between 50% and 75%.

for receiving direct income payments since 2003, these payments existed in other commodity sectors before 2003 without any compliance conditions attached. Therefore, they tend not to be perceived as payments for rendering environmental services, are not linked to compliance costs and can impact rather differently on producers depending on their farm size and farm characteristics. It follows that the associated costs and administration are less well accepted. One has to conclude that farmers are more willing to adopt agri-environmental measures voluntarily when they see it as generating additional farm income, and see these measures more positively than the compulsory cross compliance requirements. Table 14.5 summarises evidence from the producer survey on the impact of cross compliance on their costs. Producers were asked to name one or two of the cross compliance areas that had increased their costs the most.[106] The shares of respondents selecting different options are shown. It is not possible to distinguish from the replies given between initial costs due to investment and adaptation, and on-going costs.

Table 14.5 Impact of specific types of cross compliance on costs, % of respondents

Perception of increased costs due to cross compliance	Increased costs due to measures with respect to						
	Animal welfare standards	Animal identification & registration	On-farm pesticide use and residues	Protecting groundwater from pollution by dangerous substances	Protecting waters from nitrates used in agriculture	Protection of the environment from animal sewage sludge	Other
56	28	32	13	18	22	1	7

Source: Producer survey.

Two groups of survey participants (in Franche-Comté, France, and Galicia, Spain) also mentioned their receipt of payments under Article 68 of Reg (EC) 73/2009. The French recipients (half of those sampled in Franche-Comté) qualified for Article 68 payments as milk producers in mountain areas (receiving €20/t of milk for the first 100 000 kg), whilst nearly all respondents in the Galician sample received an Article 68 payment targeted on milk producers in disadvantaged areas who belong to a PDO or PGI organisation, or some other quality certification system, or who produce organically. These are the only two Member States who currently apply the Article 68 provision to dairy farms. Spain was the only Member State to provide coupled payments to dairy producers under Article 69 of Reg (EC) 1782/2003, which preceded Article 68 of 2009. In that scheme, aid at €3.80/t of quota (up to a maximum of 500 t of quota per farm) could be paid to all milk-producing farms engaged in a programme to improve milk quality. Given the very wide parameters defining quality improvement in that scheme, nearly all milk producers met the requirement. This motivated a tighter definition of eligibility for the Article 68 payment.[107] It is outside the scope of this report to analyse the effectiveness or the efficiency of these payments, which would require a dedicated study. However, as regards coherence, it is clear that their objectives are highly compatible with those of the Rural Development Programme.

Another area where there is reciprocal synergy between the objectives and impacts of CAP dairy measures and RD measures concerns organic milk production. Organic production has been defined in EU legislation since 1991, and since then has attracted various conversion and production aids. Under both the 2000-2006 and 2007-2013 Rural Development programmes, aid for the conversion of milk production to organic principles has been available.

Table 14.6 illustrates the growth of organic milk capacity for some EU Member States (empty cells mean that data were not available, or in a few cases, were rejected as unreliable). It is not known to what extent the increases shown are due to conversions of existing conventional herds as opposed to growth of established organic herds, or what role the conversion aid has played, although anecdotal evidence suggests it has been significant. Organic production yields environmental benefits. In addition, organic milk obtains a higher price (see information on the pricing system in EQ2), and hence it contributes to milk revenue and to the income objective of CAP dairy policy.

[106] For the specific legislation underlying the cross compliance requirements associated with Pilllar 1 payments, see Council Regulation (EC) No 73/2009, especially Annex II.
[107] Article 69 payments to Spanish milk producers totalled €18.6 mill (2006), €18.1 mill (2007), €19.8 mill (2008) and €19.8 mill (claimed, 2009).

Table 14.6 Number of dairy cows on certified-organic farms, thousand, 1998-2009

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria							86.90	81.05	81.38	81.56	85.11	91.04
Belgium		6.70	7.45	9.28	8.99	7.89	7.99	4.67	8.30	7.73	8.31	11.35
Denmark	36.87	51.10	66.01	64.36	61.54	56.43	53.12	52.03	53.13		56.56	62.12
Finland			3.65	3.56	4.54	4.99	5.05	4.60	4.62	4.76	5.04	4.89
France				46.56	55.20	58.94	62.49	66.12	59.73	59.18	61.39	62.58
Germany												
Greece					0.55	0.40	0.48	0.00	0.31	1.28	1.40	
Ireland								0.75	0.85	1.00	1.10	1.40
Italy					30.97	40.75	38.28	57.09	58.44	59.40	47.52	44.31
Luxembourg					0.24							0.44
Netherlands	10.59	13.41	16.97	17.18	16.51	15.89	15.63	15.90	16.18	17.47	18.55	24.00
Portugal												
Spain							2.28	2.53		2.79		
Sweden						22.22	21.89	22.32	24.14			34.12
Un'd Kingdom						90.14	83.25	58.58				145.10
Cyprus												
Czech Republic							2.87	0.00	4.32	4.48	4.95	2.61
Estonia								2.58	3.23	2.68	2.72	3.05
Hungary												3.44
Latvia							3.45	7.59	3.14	3.79	4.46	5.47
Lithuania							3.05	1.79	6.27	7.96	9.40	8.31
Malta												
Poland											12.78	19.41
Slovakia						1.27	1.55	3.08	5.00	5.00	4.42	4.41
Slovenia							1.00	0.97	0.92	1.23	1.09	1.17
Bulgaria									0.07			0.17
Romania									8.24	4.89	4.30	4.30

Source: Eurostat.

In summary, this review of the ex post evidence suggests that concrete synergies have been obtained between CAP dairy measures and rural development measures.

14.5 Conclusions to EQ10.1

On the whole, there is a good degree of coherence between the CAP dairy measures on the one hand, and rural development measures and state aids on the other hand. In terms of their objectives, they are strongly compatible, although in the ex ante review in section 14.3 the possibility for conflict between impacts of dairy policy measures and more specific targeted objectives of rural development measures were noted.[108]

An important difference between the three sets of measures is the level at which they operate: uniformly across the EU, EU-wide but on a regionally selective basis, and within individual Member States. Their targets – markets (their functioning and balance), individual farms and rural economies, and specific national problems or priorities – are also quite distinct (although the move of CAP dairy measures into the domain of individual farm operations with the advent of cross compliance within Pillar 1 is noted).

This relative compartmentalisation has several consequences. First, these three sets of measures can generally be seen as complementary rather than duplicating each other. Second, the effectiveness of the RDP measures and the state aids is not so visible to sector participants if they are removed from the immediate sphere of impact of these measures. This should not be taken as evidence of low effectiveness. It is not within the scope of this evaluation to ascertain their effectiveness, which requires separate study.

[108] This possibility has been identified in a particular context, namely where the drive for greater market orientation could have collateral effects that run counter to current RD objectives.

Summary of findings for each indicator, EQ10.1

Indicator	Expected result	Evidence found
Economic viability		
▪ *Economic viability of dairying*		
Evolution of farm profitability over time	It was expected that the fall in dairy farm income, if any, once the increase in SFP as a result of decoupling the dairy premium is taken into account, would be much less than the fall in the milk price. The actual fall in income was to be verified from the data.	The evidence indicates that dairy farm incomes have not suffered. The trend over time in various income definitions has been more or less maintained, as has the position of dairy farms relative to other types of farming.
Changes in gross margins		
Share of specialist dairy farms having a non-negative income		
▪ *Contribution of dairy farming to the rural economy*		
Integration of dairy farms in the local economy	No prior expectations.	Evidence from the producer survey shows the diversification of dairy farms into other income-generating activities in the local economy.
Rural employment		
Number of dairy farms	The number of farms with dairy cows, and the number of specialist dairy farms, were expected to continue falling due to structural change. A possible increase in this trend following 2003 was expected.	Evidence was found to support the expected result.
Number of AWU related to dairy	Due to economies of scale, which are labour-saving in dairying, dairy labour was expected to fall somewhat faster than the number of dairy farms.	Evidence was found for specialist dairy herds. This result is also likely to hold for all dairy herds.
Impact of dairy policy on continuation of dairying	It was expected that the reforms could well encourage and facilitate the departure of marginal or less committed dairy farms.	Evidence from the producer survey does not support the expectation. Evidence provided in Chapter 13 even shows a positive net increase in herd numbers in a few Member States in the last few years. It is many years since this has been observed. Producers considered SFP/SAP, AE and LFA payments to be important for helping them to stay in production.

Table continues on the next page.

Support for modernisation and investment		
Use of higher milk revenues	The use of higher milk revenues for farm investment was expected.	Evidence was found. Producers took the opportunity of windfall higher prices in 2007-8 to engage in investment activities. This implies an 'investment constraint' in normal years, and hence that RD investment grants do not produce deadweight.
State aid provided to dairy farmers	No firm expectation.	No incidence was observed and no judgement was provided by the producer survey.
State aid provided to dairy processors	No firm expectation.	Some processors surveyed considered state aid to be a useful, supplementary contribution.
Contribution to/constraints from sustainability		
Receipt of Pillar 2 agri-environmental payments	Since these programmes are voluntary, it was expected that only producers who could accommodate them into their farm plans would subscribe.	A significant share of producers, particularly in LFAs, opted for these programmes and were generally positive about them.
Compatibility between production plans and environmental restrictions	It was expected that frictions with production decisions were more likely regarding cross compliance than Pillar 2 programmes.	Evidence was found to support the expectation. Over half of respondents considered that cross compliance led to increased costs.
Organic milk production	The stimulation of organic milk production under Pillar 2 was expected to be attractive to some producers, but no expectations were formed about whether the trend would continue or be affected by the policy reforms.	There has been a steady increase in the share of organically produced milk.

14.6 EQ10.2: Coherence with the principles of the 2003 reform

The 2003 reform was based on the following principles:[109]

- greater market orientation of EU agriculture and its increased competitiveness,
- maintenance of overall income support at the current level,
- fairness (a 'fair' standard of living for the agricultural community),
- more sustainable production,
- maintenance of rural areas,
- simplification of policies and their administration.

At this level of generality, these principles coincide with the global objectives already identified for CAP dairy policy in Section 14.3. However, in examining whether the impacts of CAP dairy policy have been coherent with the principles, some additional assumptions are needed.

[109] Please see Table 3.1 for the relevant legislation, and specific recitals in this legislation, in which these principles are enunciated.

First, the principle of maintaining overall income support at the current level could be understood in two ways, either "maintaining the support provided" or "maintaining the support received". It turns out that it makes a difference to the evaluation judgement which interpretations is used.

Second, the concept of a 'fair' standard of living or 'fair' producer incomes embodies a societal value judgement, which makes it hard to evaluate in an objective ex post analysis. The criteria used in attempting to make a value-free assessment of the impact of CAP dairy measures according to this objective need some discussion. 'Fairness' of a policy outcome can be defined in terms of what stakeholders expect given what has happened in the past, and in terms of the guarantees or promises received from policy makers. It is also conditioned by how they view their situation in relation to other similar groups, and whether any acute problems they have as a group that are not experienced by others are recognised sympathetically by the policy process. This leads to the formulation of three criteria: continuity with the past, policy response to emergent issues, and assessment of the position relative to other farming sectors. The first criterion – continuity with the past – corresponds very closely to the second of the CAP reform principles listed above. The fact that the legislation states 'maintenance of overall income support at the current level' as a key principle of the reform has reinforced producers' expectations of this outcome. Given the events that occurred during the evaluation period, the second criterion (handling of emerging special issues) has to focus on the issue of price volatility. The third criterion is straightforward: dairy farming has always been one of the better rewarded farming sectors, given its high requirements of management and husbandry skills, and capital inputs. Erosion of this relative position would be considered 'unfair' by the stakeholders involved.

Third, discussion of the sustainability of agriculture usually emphasises its impact on the environment and natural resource conservation. However, a second important aspect of agriculture's sustainability is its socio-economic and demographic viability. For this reason, we propose indicators of both these aspects of sustainability. Given the multi-dimensional nature of the second aspect, many indicators could have been chosen. The selection is limited here to several indicators of the attractiveness of dairy farming for young farmers or new entrants, which can be interpreted as a proxy for a number of related characteristics.

Many of the trends discussed in this evaluation question have already been investigated in the course of answering earlier evaluation questions. Where this is the case, the indicators already used and the findings reported are adopted here, although they are interpreted in a different context. In other cases, new indicators are proposed. This is clarified in Table 14.6 describing the indicators.

Table 14.7 sets out the indicators to be used for examining this question.

Table 14.7 Judgement criteria and indicators for EQ10.2

Indicator	Data requirement	Information sources
More market oriented and competitive agriculture • *Market outcomes*		
Comparison of internal and international prices	Price series dairy products Production costs for milk	EQ3, EQ5 EQ4
Levels of import tariffs and export refunds	Tariff rates and export refund rates for specific dairy products (EU market level)	Eurostat
Presence of imported dairy products on EU market	Percentage of TRQs for dairy products that are filled	Eurostat
Share of dairy exports without export refund	Trade data on total and subsidised exports of dairy products (EU market level)	Eurostat
EU presence on world market	EU's share of the world market for the main dairy exports	Descriptive Chapter (COMTRADE)
• *Structures*		
Economies of scale in milk production		EQ1b, EQ3
Economies of scale in milk processing		EQ7
Extent of specialisation	Share of milk coming from specialised dairy farms	EU-FADN

Table continues on the next page.

Maintenance of income support at current level		
Evolution of total support to producers	Market price support + direct payments index	EQ9
Fair producer incomes		
Annual income trends	Farm income per AWU over time (at MS level)	EQ3
Variability of milk price	Volatility index	EQ2
Stabilising effect of direct payments on dairy income	Share of direct payments in income of specialist dairy farms	FADN
Relative income	Dairy income relative to all types of farm income	EQ3
Sustainability of agriculture • *Environmental sustainability*		
Environmental footprint of aggregate milk production	Trends in dairy cow numbers, yields and average herd sizes	Descriptive Chapter, EQ1b
Production intensity	Intensity of milk production per hectare of fodder area for specialised dairy farms	FADN
Dairy farmers' participation in agri-environmental schemes	Participation of dairy farmers in AES	Descriptive Chapter, EQ10.1
Milk production in LFAs	Qualitative information	Descriptive Chapter, EQ1b, Producer Survey
• ***Socio-economic sustainability***		
Human capital in dairy farming	Age structure of farmers on specialised dairy farms	EQ9
	Presence of successors on dairy farms	Producers' & ex-producers' survey
Administrative simplification		
Trend in administrative input	Qualitative information	EQ9

14.6.1 More market-oriented agricultural markets and a more competitive agriculture

Market orientation

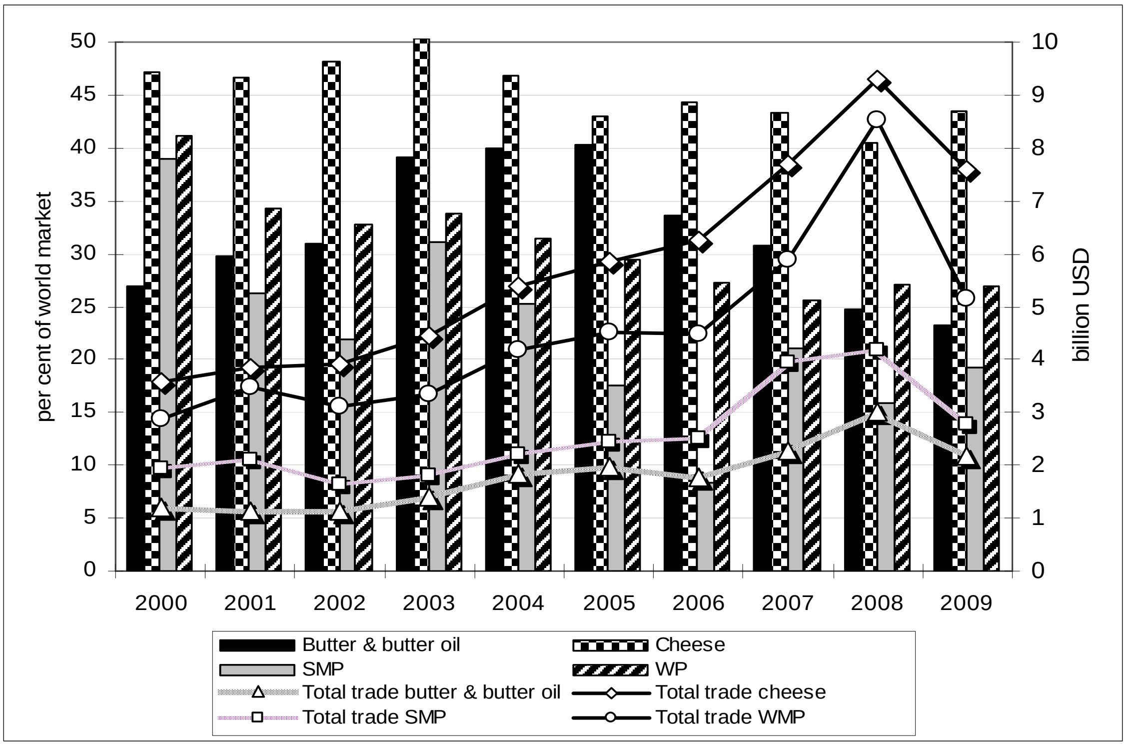
Analysis reported for EQ3 shows that, for EU-15, the total costs of milk production in euros per tonne on specialist dairy farms fell by 4.6% between 2000 and 2003, and rose by 6% between 2004 and 2007, For EU-10, the increase between 2004 and 2007 was 30%, but this figure includes the more general effects of adopting the CAP and entering the Single European Market. Although various factors lie behind these trends in costs before and after the 2003 reforms, the trends themselves do not indicate that more market-oriented policy environment led to greater cost competitiveness.

EQ5 documents the price competitiveness of EU dairy products on the world market. Figures 9.1, 9.3, 9.5 and 9.7 show the monthly evolution of the price gap between these two prices for butter, SMP, WMP and cheddar cheese for the period 1997-2010. For all four products, this period can be conveniently divided into three sub periods. Up to 2003, the price gap is substantial, with the EU internal price for butter and WMP between 50% and 100% higher than the world market price, slightly less for SMP and more than twice as high for cheddar cheese. The price gap narrows considerably for both SMP and WMP prices during an 18-month period in 2000-2001, when world market prices increase sharply and a much smaller rise is transmitted to internal prices. From 2004 to end-2006/start-2007, the price gap narrows for all four products, in most cases because world market prices are rising, although for butter world market prices remain rather steady and it is the internal prices, nudged downwards by the intervention price for butter, that reduces the price gap. The third sub-period coincides with the world market turbulence referred to already in a number of the EQs. During this period, the price gap closes almost completely for all four products, in a few cases becoming negative for some months, and with the internal price closely tracking movements in the world market price. From this evidence, it can be concluded that the 2003 reforms together with rising world market prices made EU dairy products more competitive on the world market during the period 2004-2006, but this trend was then completely overshadowed by the commodity market boom. Without evidence to suggest otherwise, it is likely that in the more stable conditions from 2010 onwards, this lower price gap will again become evident in the data.

Raw milk is hardly traded on international markets. Therefore, this report (EQ4) tried to use data on international production costs to compare the competitiveness of milk with other major milk producers. The evidence obtained is very patchy. What emerges clearly is that EU producers receive a much higher price than the least-cost producers in Oceania. However, the data are not good enough to support a judgement on whether, or to what extent, the competitiveness gap in primary milk production has closed since the replacement of some EU price support by direct income support.

Figure 14.2 shows the changing pattern of EU world market shares for the four main export products over the last decade. This evidence is inconclusive regarding any increased competitiveness of EU exports after the 2003 dairy policy reform, as there were various factors at work here: a policy of taking advantage of rising world market prices to reduce EU intervention stocks, the continuing use of export refunds and an increasing volume and value of total world trade. The first of these factors is an indicator of growing competitiveness, the second overstates the competitiveness of EU exports whereas the third tends to reduce its significance. What is clear is that (a) the EU remains a major participant in world dairy markets (b) market shares of butter, SMP and WMP declined since the middle of the decade and (c) the share of the cheese market remains buoyant despite the more rapid growth in total world trade in cheese, and the reduction in the use of export refunds for this commodity. It is certainly valid to conclude from this picture that the CAP dairy reform, by achieving a better structural balance, has given the EU more room to play to its strength on the world market as an exporter of higher-value cheese.

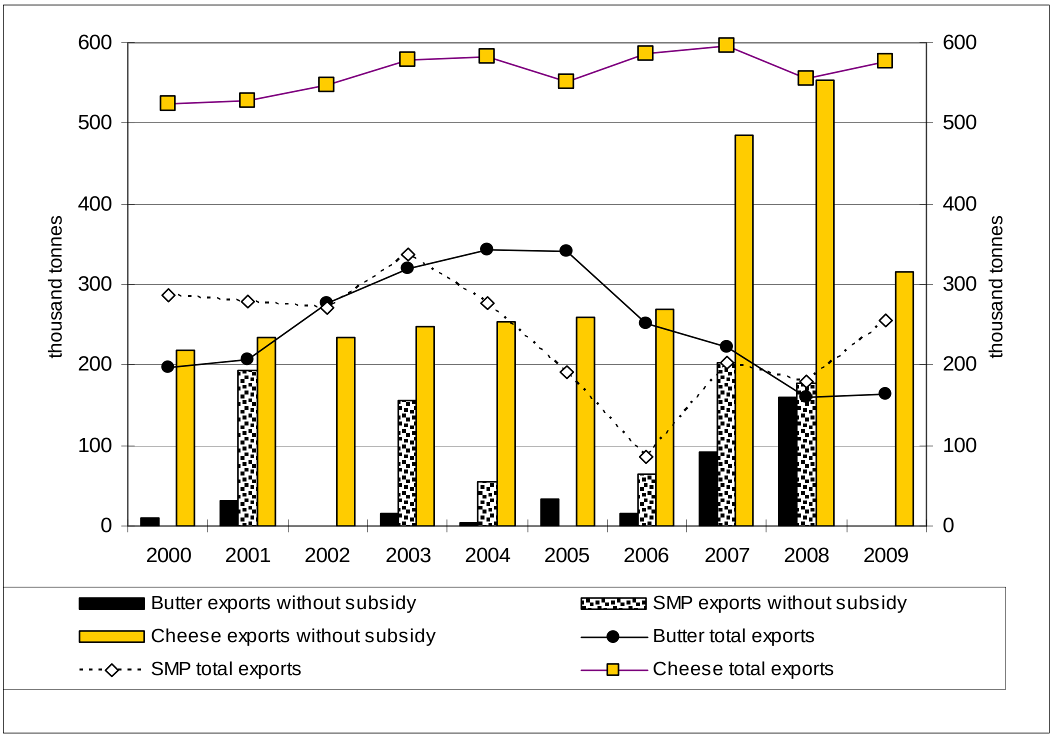
Figure 14.2 EU world market share for dairy products and evolution of world exports for these products, 2000-2009



Source: COMTRADE.

Figure 14.3 shows that up to 2006, over 40% of cheese exports were unsubsidised, and this proportion was slowly increasing. It shot up to over 80% in 2007. In 2008, shares of unsubsidised exports in the total were nearly 100% for all three commodities shown, but by 2009 the share had dropped to zero for butter and SMP, and that for cheese was around 55%. The underlying trend post-2003 may well have been towards a smaller need for export subsidies, once intervention destocking was complete, but it is completely masked by the impact of unusual world market conditions in 2008- 2009.

Figure 14.3 Unsubsidised and total exports of butter, SMP and cheese, 2000-2009



Source: DG AGRI (various years and unpublished).

Regarding imports of dairy products, the applied tariff structure offers high protection against imports from outside the EU. With a reduced intervention system and the disappearance of most internal disposal aids, maintaining these border controls is a crucial element in the management of the EU dairy market, and one that has remained intact throughout the decade.

Given this level of protection, it follows that virtually all imported dairy products enter the EU under tariff rate quotas, which specify limits (ceilings) up to which specific tariff lines can enter at a lower rate of tariff. Table 14.8 shows the most important bilateral and *erga omnes* tariff rate quotas for butter, cheese and SMP over the period 2000-2009. There is only a very slight increase in total bilateral TRQ capacity during the period. However, it is striking that the fill rates for the bilateral TRQs for butter and SMP dropped markedly in 2004, due to reducing EU prices (this was the first year of the cuts in intervention prices) and somewhat higher world prices, and have remained lower than prior to 2004. Not only has this helped marginally to improve internal market balance, but it is also an indication that exporting countries find the EU market, with its lower prices, less attractive. By implication, they now face more domestically-generated competition within the EU than in some other export destinations.

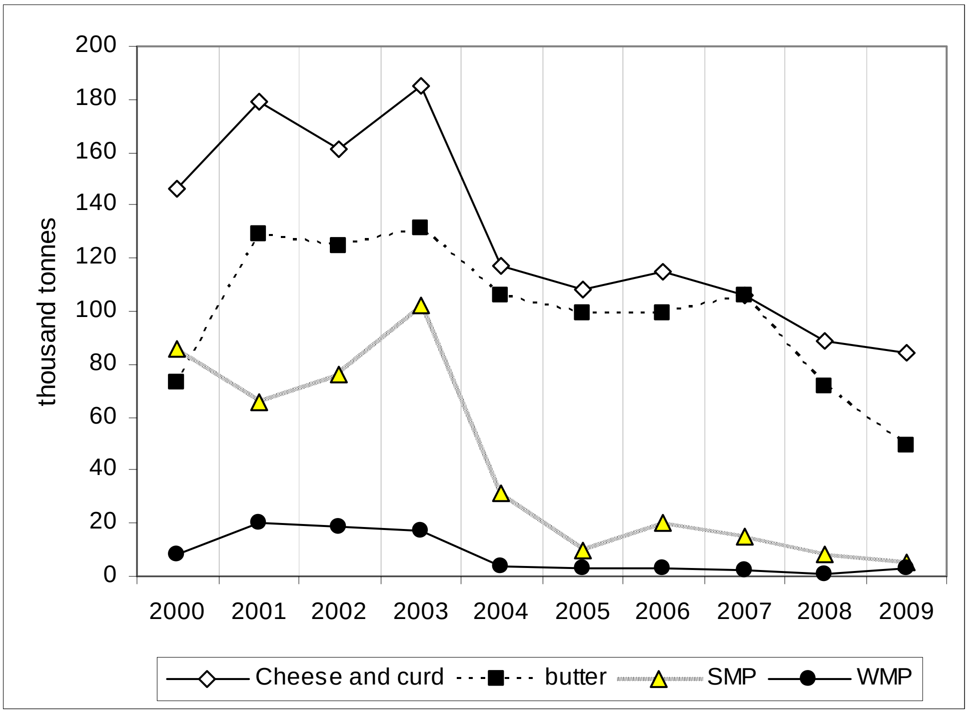
Table 14.8 Applied tariffs for imports into the EU (GATT years) (all quantities in thousand tonnes, all tariffs in €/100kg)

Country or origin		2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9
Butter (HS 040510)										
New Zealand	TRQ quantity	76.667	76.667	76.667	76.667	76.667	76.667	74.693	74.693	74.693
	in-quota tariff	86.88	86.88	86.88	86.88	84.88	84.88	70	70	70
erga omnes	TRQ quantity	10.00	10.00	10.00	10.00	10.00	10.00	11.36	11.36	11.36
	in-quota imports	9.23	9.84	9.91	10.00	5.61	2.76	5.68	5.78	0.00
	in-quota tariff	94.8	94.8	94.8	94.8	94.8	94.8	94.8	94.8	94.8
erga omnes	out-of quota tariff	231.3	231.3	231.3	231.3	231.3	231.3	231.3	231.3	231.3
Cheese cheddar (HS 04069021)										
New Zealand	TRQ quantity	7	7	7	7	7	7	7	7	7
	in-quota tariff	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06
Australia	TRQ quantity	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
	in-quota tariff	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06
Canada	TRQ quantity	4	4	4	4	4	4	4	4	4
	in-quota tariff	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75	13.75
erga omnes	TRQ quantity	15.00	15.00	15.00	15.00	15.00	15.00	15.01	15.01	15.01
	in-quota imports	14.73	14.91	14.94	15.00	15.00	15.00	15.01	15.01	15.01
	in-quota tariff	21	21	21	21	21	21	21	21	21
erga omnes	out-of quota tariff	167.10	167.10	167.10	167.10	167.10	167.10	167.10	167.10	167.10
SMP (HS 04021019)										
erga omnes	TRQ quantity	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.54	68.54
	in-quota imports	49.48	34.67	51.90	57.18	1.34	0.00	16.51	0.19	0.10
	in-quota tariff	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5
	out-of quota tariff	118.8	118.8	118.8	118.8	118.8	118.8	118.8	118.8	118.8

Source: WTO notifications and TARIC.

Figure 14.4 shows the evolution of total imports of the four main dairy products over the same period. Three main periods can be distinguished: up to and including 2003, when imports were are their highest levels, 2004-2007 when there was a downward shift in the underlying level, and then 2008-9. The downward shift between the first and second period is more marked for cheese than for butter, which is consistent with the observation in Chapter 6 that cheese prices reacted more to the 2003 reform than those for the other dairy products. This information adds further support to the evidence provided in Table 14.8 based on the fill rates of a number of specific TRQs, that the EU internal market offered less of a 'preference margin' to other trading countries after the reform. This is indirect evidence of more competitive internal prices and supplies.

Figure 14.4 EU imports of dairy products, 2000-2009



Source: COMTRADE.

More competitive structures

EQ1b documents the increase in herd size across the EU before and after the 2003 dairy policy changes (see Table 5.8, Figures 5.8 and 5.9). Herd sizes expanded in most EU Member States in both sub-periods but there was no clear evidence that average herd size increased *faster* from 2004-2005 onwards when quota constraints became less restrictive for various reasons. The policy changes were expected both to create an incentive for expansion by producers intending to remain in milk production for the longer term *and* to facilitate expansion by inducing others to leave. However, there is insufficient evidence to conclude that the policy changes provided a stimulus to economies of scale through herd expansion.

There is widespread evidence that milk production costs are lower and income is higher on specialist dairy farms than for dairy herds that are not on specialist dairy farms. Therefore, a growing share of total milk output produced on specialist dairy farms is an indicator of the sector's increasing efficiency due to a structural shift of production capacity between these two types of farm. The shift between specialist and non-specialist farm types has been investigated using EU-FADN data for EU-15 Member States from 2000 to 2007. In 2000, there was a wide range between Member States in the share of milk coming from specialist dairy farms: just 51% in Austria to over 98% in Finland. The EU-15 (simple) average share across Member State was 83.1%.

In 2007, the average share of milk coming from specialist dairy farms in EU-15 had reached 86.8%, a rather modest increase compared with 83.1% in 2000. However, when Member States are broken down into two groups – those with a share of less than 92% in 2000 and those with a share greater than 92%[110] - some striking differences emerge.[111] Between 2000 and 2003, the average share (simple arithmetic average) in the first group increased by just 0.18% p.a. and in the second group it fell by 0.13% p.a. However, over the period 2003-2007, annual rates of growth of the average share were 1.6% p.a. for the first group and 0.24% p.a. for the second group. It can be concluded from this

[110] The first group contains, in increasing order of share, Austria, Belgium, France, Luxembourg, Germany, Ireland, Spain and Denmark. The second group contains, in ascending order of share, Italy, the UK, Sweden, Portugal, the Netherlands and Finland.

[111] The threshold of 92% was chosen after inspection of the data, as it appeared to mark a natural boundary between those Member States where the share was growing more rapidly, and those member States where it was growing slowly or in slight decline.

comparison that in those Member States with a lower degree of specialisation in 2000, the post-2003 period coincides with a shift in capacity from non-specialist to specialist herds. This was undoubtedly achieved by a faster rate of exit of non-specialist herds, and was most likely stimulated by the policy changes. It is not surprising that in the second group of countries the increase in the share is smaller than that of the first group after 2003, since they were already much closer to the upper boundary of 100% at the start of the period.

The EU-FADN data on the shares of specialist and non-specialist dairy farms for EU-10 Member States starts only in 2004. In that year, there was even greater heterogeneity between countries than in EU-15, with Slovakia and the Czech Republic having shares of only 23.9% and 24.3%, respectively, and Slovenia registering a share of 88.6%. In the years following accession, there is no clear pattern of development. In some of these countries, the share fell, in others it appears to oscillate and in a few there was a steady increase.

The evidence presented in EQ7 on structural adaptation in the processing sector is also mixed. Although in aggregate the number of dairy enterprises fell and the average throughput per enterprise increased in EU-15 between 2003 and 2009, there is an increase in the total number of enterprises over the EU-10 Member States (where data are available) (see Table 11.2). Even within EU-15, the trends differ between Member States. The general pattern is that the observed consolidation of dairy enterprises tends to occur in countries where there were more, smaller operations, and hence gains from economies of scale to exploit, whereas the increase in the number of enterprises occurred in countries where the industry was already highly rationalised and hence it probably caused little deterioration in average efficiency. However, even if on balance structural changes in the processing industry did lead to increased economies of scale after the policy reforms, there is no evidence that it was due to these reforms. The comments of respondents in the processors' and experts' survey stress that the industry downstream of farming is driven strongly by market forces, horizontal competition and pressure from retailers to lower prices, rather than by CAP dairy policy.

14.6.2 Maintenance of income support at current levels

This question was addressed in depth in EQ9. The following conclusions were reached:

- The amount of support going to producers, both from the budget and via 'hidden' transfers from consumers, declined very considerably between 2002-3 and 2009. However, this was at least in part due to the extremely high prices on world markets, which rendered export subsidies and intervention storage redundant and eliminated the price gap between domestic and world market prices for the basic dairy products (see Figure 13.10).
- Estimates of what would have happened under 'normal' conditions shows that the policy changes would still have caused a fall in total support (from consumers and from the EU budget under the heading "current dairy policy") (see Figure 13.11).
- Even when it is taken into account that some continuing budget support has been renamed and moved to another part of the budget (fully in line with the new conceptual basis and delivery mechanism for that support), the total cost of annual support would still have been about 22% lower in 2007-2009 than in 1999-2003 (see Table 13.7).

How these results are evaluated depends on which interpretation of the corresponding reform principle is chosen. If this principle implies that the total burden of support falling on consumers and the budget should be maintained, then clearly the CAP dairy reform has overshot the target, since dairy support costs the rest of the economy less than before. If it means that the amount of support *received by producers* should be maintained, then it depends on whether under the new policies the transfers from other parts of the economy to the dairy sector are made more efficiently. Lower support cost is compatible with maintaining the level of support received if the transfer efficiency of delivering the support improves, i.e. a greater share what consumers and taxpayers give up in order to support dairy incomes actually reaches the intended beneficiaries. According to this interpretation, the evidence shows that the outcomes of the CAP dairy policy changes are fully coherent with the 2003 reform principle. Moreover, they go in the direction of the aim associated with this principle "to increase the effectiveness of direct income aid, while leaving the actual amounts paid to farmers unchanged" (recital 24, Regulation

(EC) 1782/2003), although in this case it is more a question of replacing some (less effective) market price support with some (more effective) direct income support, which can be done at a rate less than one-for-one while maintaining *support received*.

14.6.3 Fair producer incomes

Trends in milk producer incomes (various definitions) before and after the policy changes are extensively documented in other evaluation questions (see Tables 7.3, 7.4, 7.6, 13.8 and Figure 13.12). Farm Net Value-Added per Annual Work Unit (FNVA/AWU) for EU-15 specialist dairy farms was 48% higher in nominal terms in 2007 relative to 2003 (with all Member States showing a healthy increase), and 58% higher in nominal terms for EU-10 relative to 2004. In real terms, these increase amount to 34% and 79%, respectively. Thus, up to 2007, expectations of the continuity of past income trends were met. Unfortunately, the EU-FADN data base is not yet finalised for the following two years, which would permit the picture to be extended right through the period of the price spike and collapse.

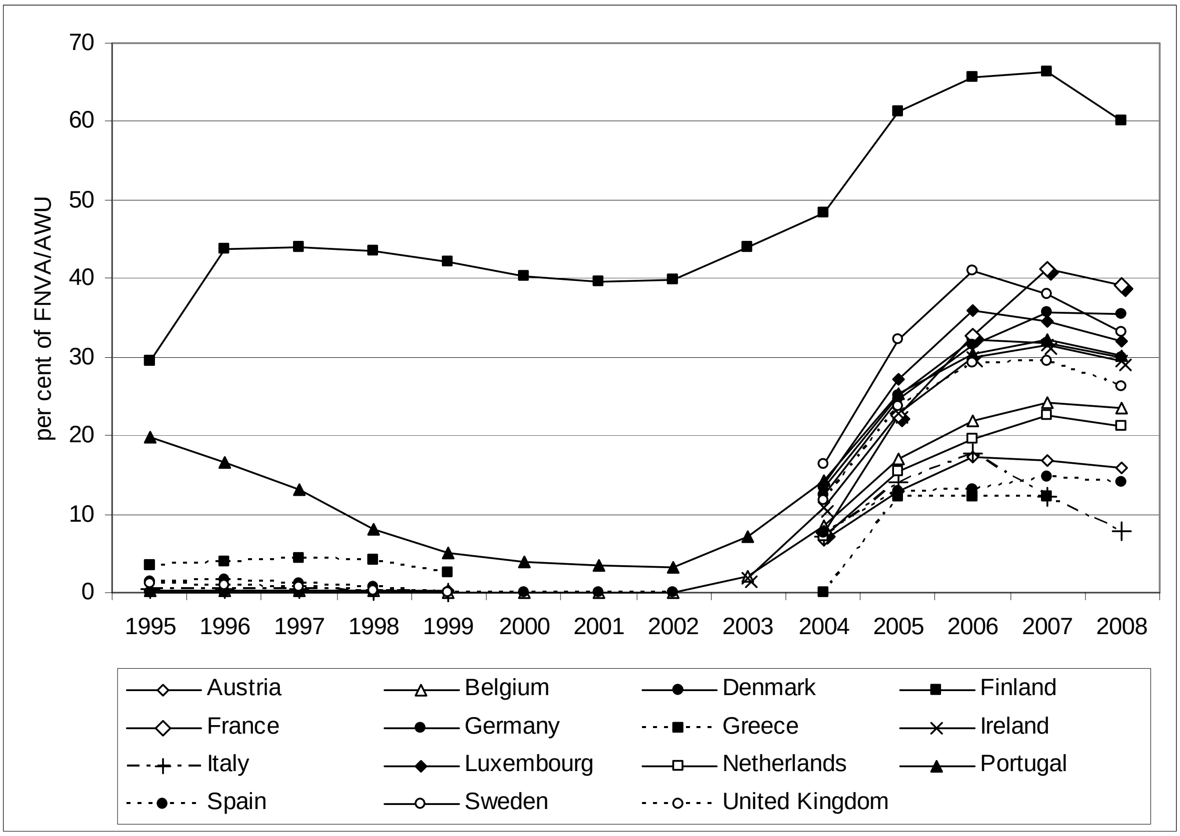
It is not possible to examine the variability of farm income using the more sophisticated techniques that were used to measure the volatility of prices in EQ2 and EQ5. This is because agricultural income is an annual concept, and in order to have enough observations to apply this methodology with justification, one would have to extend the evaluation period for several decades or more into the past, which makes no sense. Moreover, the essential concept here is the variability at the level of the *individual farm business*, which cannot be easily examined using the EU-FADN database using the simpler price band method because of the frequently changing composition of the sample. Therefore, two other indicators are used. First, the indicator of milk price volatility calculated for EQ2, and second, the share of direct payments in Farm Net Value-Added. As a caveat, it is recalled that the variability of farm income depends on variability in output price, production cost per unit, and the amount of output produced. At farm level, output quantities can vary considerably depending on weather conditions over the year, and (partly in relation to these same factors) production costs also have a degree of variability (see Table 7.18). Thus, not all income variability can be traced to price variability.

The use of the second indicator relies on the fact that the direct payments in question are for the most part *either* fixed independently of dairy variables like market prices or farm output, depending instead on a historic reference, *or* - during the sub-periods were the dairy premium was still coupled to milk - they depended on the amount of quota held at the end of the year which, again, is relatively stable from year to year and not affected by short-term market phenomena. The higher the share of these fixed payments in total income, the more stable income will be from year to year, since the part of income that is vulnerable to price, cost and output variability is a smaller share of the total. Since these payments are policy-determined, a growing share of this stabilising component in producer income over time can be attributed directly to policy.

Figure 6.7 shows that the volatility of the EU producer price for milk doubled during 2007, and for most of the following two years it remained at historically very high levels. The reasons for this are analysed in EQ2. EQ5 compares the volatility of EU domestic prices for butter, SMP, WMP and cheeses with that of the corresponding world prices, and reports similar findings. For all these products except cheese, prices were much more volatile from end-2006/early 2007 onwards until around early 2010. This was a new phenomenon for the sector, and particularly for the milk producer. Milk returns were strongly affected both in the upward and downward phase of the price spike. EQ2 and EQ5 explain *why* this phenomenon occurred. It required the combined interaction of a lower intervention safety net *and* extremely high (as opposed to merely volatile) world market prices to produce it.

As explained in EQ2, this unexpected development reveals a missing element in the set of measures available for achieving internal stability in such conditions. However, Figure 14.5 shows that, because the direct payment component of dairy farm income is now much higher than before the reform, incomes are less affected by such turbulence than they would have been without these payments.

Figure 14.5 Share of direct payments in FNVA, EU-15, 1995-2008[1]



Notes: 1) The series are shown in the form of 3-year moving averages so that trends emerge more clearly.
Source: EU-FADN.

By 2007-2008, ten Member States of EU-15 had an average share of direct payments in FNVA of between 20 and 40%, which was much higher than for the pre-2003 period. The case of Finland is an anomaly, since the figures shown include an additional national subsidy.[112]

Finally, regarding dairy income relative to other farming sectors, EQ3 (Table 7.8) shows that for the majority of EU-15 Member States, FNVA/AWU is higher than in other key farming sectors, and that in many Member States the relative position has improved or remain rather constant since the early 2000s.

Therefore, apart from the emerging issue of price volatility, where a solution is still being sought within the reformed CAP for dairy, the selected indicators for the concept of 'fair producer income' show that CAP dairy measures are coherent with this principle of the CAP reform. One aspect of fairness regarding producer income support under the CAP that has not been addressed yet relates to the inequality in the distribution of support between holdings, based as it still is on the size of the holding.[113] Clearly, this is an issue that involves the Single Payment System generally, and cannot be dealt with by dairy policy alone. However, it is a remnant of the earlier support philosophy, which was based on commodities and was production-linked (and hence largely determined by farm size), with larger farms getting much more support than smaller farms.

[112] In 2007, the region-specific subsidy was paid at the rate of €0.03-0.09/litre (Lehtonen, 2007).
[113] See, for example, Keeney (2000).

14.6.4 Sustainability of agriculture

Environmental sustainability

Dairy cows are highly polluting production units, in terms of their greenhouse gas emissions and their waste products.[114] However, higher-yielding dairy management systems result in lower emissions per unit of milk produced. Moreover, technologies for the efficient handling of manure become more economic with larger herd sizes that can exploit technological economies of scale or justify advanced technologies such as anaerobic digestion of waste for renewable energy production. For these reasons, a key indicator of the sustainability of milk production is the number of dairy cows in the sector in relation to their yields, the total amount of milk produced and average herd size. The evolution of these parameters has been discussed already in different evaluation questions and is summarised here.

After reaching a peak in 2001, dairy cow numbers in EU-15 have fallen in most years since then, and in 2010 were 8.7% below the numbers of 2003. Rates of decline have been faster in the Member States of EU-10 since their accession (EQ1b, Table 5.5). Yield growth for EU-15 accelerated after 2003. The underlying trend in milk yields has been positive everywhere, more so in EU-10 than in EU-15 (Table 2.4). Aggregate production for the current 27 Member States has remained more or less constant (EQ1a, Figure 5.1). Average herd sizes have been increasing in the EU as a whole since the 2003 reform, although there were decreases in a few Member States in the transitional years around the year of decoupling (EQ1b, Table 5.5). These trends lead to the conclusion that since 2003 the aggregate environmental footprint of the EU dairy sector has declined somewhat faster than the previous trend.

The impact of dairying on the environment depends also on the intensiveness with which land is used. Land use intensity is reported with the indicator "milk per tonne of forage area" in Table 14.9. For Member States of EU-15, sufficient data points are available to draw the conclusion that the medium-term upward trend continued after the reform as before. At first sight, this runs counter to expectations: the switch to the dairy premium followed by decoupling means that less of the return to milk is related to the current quantity of production, and therefore the incentive to maximise yield is *reduced*. However, although the trend has continues upwards, for EU-15 the annual rate of growth appears to have slowed down (1.4% p.a. between 2000 and 2003, as against a little over 0.8% p.a. between 2003 and 2007). Given the margin of error with time series from FADN, this difference should be treated with caution.

The most intensive production methods are found in Denmark, the Netherlands, Spain, Italy and a little behind them, Portugal. The upward trend in production intensity is also most marked in these countries. For EU-12 Member States, it is uncertain whether clear trends can be discerned from only four data points (or fewer), and possible adjustments due to EU entry should also be borne in mind. It is striking that for the three Baltic countries and the Slovak Republic, this indicator of production intensity is less than 20% the level observed in the Member States with the most intensive production methods. The average trend for EU-10 is downwards over the four years, clearly influenced by the sharp fall in Poland. It is also noteworthy that the trend is flat or has declined in the Czech Republic and Slovakia.

In summary, the policy changes have not lessened the incentives towards increasing production intensity in EU-15 Member States. Along with evidence of geographical concentration in some of these countries, we conclude that the environmental burden of milk production may have become greater locally in some of the major milk-producing countries. However, the adoption of cross compliance requirements with the dairy premium means that producers must adapt production methods and resource use in order to avoid a range of specific environmental impacts (see Table 14.5). Moreover, dairy farmers' participation in agri-environmental schemes is strong (see Table 14.4). Thus, in principle, these off-setting policies should contain the impacts of further intensification. The extent to which these measures off-set any potential environmental degradation through greater intensification needs in-depth empirical study.

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[114] See FAO (2010). Greenhouse gas emissions from the dairy sector: A life cycle assessment. FAO, Animal Production and Health Division, Rome. This study estimates the average global emissions from milk production, processing and transport to be 2.4 CO2-equivalents per kg of fat and protein corrected milk at farm gate, and that the overall contribution of the global milk production, processing and transportation to total anthropogenic emissions is 2.7%. Of this total, 93% of the life-cycle emissions are due to on-farm activities (the share is 78-83% in industrialised countries and 90-99% in developing countries).

Table 14.9 Milk per hectare of forage area (tonnes/hectare), 2000-2007

	2000	2001	2002	2003	2004	2005	2006	2007
Belgium	7.45	7.69	7.87	7.98	8.18	8.02	8.20	8.63
Denmark	10.20	9.92	10.71	10.77	11.01	12.71	12.54	12.20
Germany	7.13	6.54	7.15	7.20	7.33	7.30	7.58	7.53
Greece	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	10.82	12.32	12.39	12.24	12.20	12.39	12.94	13.26
France	4.85	4.79	4.99	4.83	4.85	5.09	4.96	5.08
Ireland	4.90	4.94	5.08	5.27	5.55	5.35	5.65	5.51
Italy	9.60	10.61	10.55	12.87	11.89	11.23	12.94	12.64
Luxembourg	4.46	4.58	4.73	4.86	4.75	4.67	4.65	4.54
Netherlands	12.68	12.16	12.33	12.62	12.03	12.57	12.73	12.64
Austria	3.57	3.61	4.05	4.25	4.31	4.31	4.68	4.73
Portugal	8.80	10.26	9.05	10.48	9.39	10.61	10.58	11.59
Finland	5.89	5.72	6.53	6.41	6.73	6.99	6.85	6.79
Sweden	5.65	5.57	5.80	5.48	5.35	5.10	5.83	6.24
United Kingdom	7.70	7.93	8.33	7.86	8.27	7.90	8.75	8.97
EU-15	7.03	7.05	7.22	7.43	7.39	7.45	7.68	7.75
Czech Republic					3.56	3.42	3.45	3.47
Estonia					2.04	2.30	2.69	2.74
Hungary					5.82	5.53	6.83	6.87
Lithuania					2.16	2.43	2.48	2.59
Latvia					1.87	1.92	1.96	1.81
Malta								
Poland					8.36	5.99	6.18	6.23
Slovakia					1.94	2.10	1.46	1.57
Slovenia					5.24	5.66	5.92	6.10
EU-10					5.11	4.62	4.44	4.55
Bulgaria								6.02
Romania								5.61
EU-02								5.70

Source: EU-FADN.

Milk production in less favoured areas tends to be less intensive and compatible with higher environmental values. Table 2.36 shows that a very significant share of milk producing capacity (although inevitably, because of less intensive production, a smaller share of output) occurs in these areas. Between 2003 and 2007, the share of EU-15 dairying in these areas has slightly increased in some Member States and slightly decreased in others, but there is no decisive trend.[115] This is confirmed by figures on rates of herd closure in LFAs relative to non-LFAs in Table 5.13. For the Member States of EU-10, a comparison is not possible since official LFA-zoning in these countries dates only from their accession. This indicator is relevant not only to the CAP reform principle of environmental sustainability, but also to the principle of maintaining rural areas.

Socio-economic sustainability

Here the focus is on the changes in the age structure of milk producers, and the outlook for the replacement of current producers. Table 13.10 shows that since 2000 but particularly since 2005, specialist dairy producers have on average become older and the age groups under 45 years of age have declined more than older age groups. The loss of attractiveness of the sector to younger new entrants since the 2003 policy changes came into force is a negative feature of the dairy sector, although whether it will become a longer-term trend is yet unclear.

Table 14.10 summarises evidence on succession plans obtained from the milk producer survey. For a little less than half of the sample, succession is not yet an issue mainly because the current producer

[115] It is of interest that, in the producer survey, LFA respondents were on average younger (46 years old) compared to non-LFA respondents (49 years old), although their herds were much smaller (average 59 cows as opposed to 105 cows). Despite the smaller average size, only 2 of the 173 LFA said their farms would close down when they retired, whereas this answer was given by 10 of the 220 non-LFA respondents. Moreover, all the farms where it was known that the successor would cease milk production were in non-LFA areas.

considers he is too far away from retirement. For over one quarter of the farms, the successor is already known, and in most of these cases he intends to continue with milk production (on average, the herds in this sub-group are the largest). But not all successors' plans are known yet, and in a few cases it is known that the successor will *not* continue with milk. This leaves nearly one in four cases where succession arrangements have not been determined, or (a small minority) where it is already known that the farm will close down. When a successor cannot be found from within the family, the farm is sold, in which case it may or may not be amalgamated with another farm, and its milk-production capacity may or may not continue to be exploited. Whatever the outcome, it is less likely to be bought by a young would-be milk producer because of the capital needed for farm purchase. The question of inter-generational succession within farming families is always relevant partly because this arrangement facilitates the take-over of the productive resources by the next generation, as well as often dealing with the retirement needs of the out-going generation. It is usually also the best way of maintaining continuity of production and maintaining the knowledge base about the specific characteristics of the farm.

Table 14.10 Outlook on farm succession

	Whole sample	Succession is not clear	Succession is not yet an issue	Farm will close down	Successor is found			
					Total	Successor will continue with milk	Successor will stop with milk	Successor's plans are unknown
Share of sample, %	*100.0*	*22.1*	*47.3*	*3.1*	*27.5*	*23.2*	*1.0*	*3.3*
Average age of producer	47	50	43	56	53	53	60	54
Average herd size (dairy cows)	85	73	79	51	106	118	62	28

Source: Producer survey.

The information presented in Table 14.10 was gathered at the start of 2011 and for lack of data cannot be compared with the outlook on this issue in the pre-reform period. This means that it contains little information of direct relevance to the *impact* of the policy changes - but much food for thought.

14.6.5 Simplification of policies and procedures

Other sections have spelled out in detail the simplifications of CAP dairy policy that have been put in place since 2003. First, the rationalisation of quota rules, the harmonisation of dairy income support with that of the other main agricultural commodities through merging the dairy premium with the SFP, abolition of most internal disposal aids, and a reduced role for the intervention system. These changes should have lowered the administrative cost of managing these polices both at EU level and in Member States. Evidence from two Member States was given in EQ9. At the same time, the administrative burden has increased for milk producers. This is not because an existing burden was somehow transferred from bureaucracies onto the shoulders of farmers, but rather because the nature of the reform – moving away from market management policies towards more targeted incentives to individual stakeholders – typically increases the need for record-keeping and form-filling for the latter.

14.7 Conclusions to EQ10.2

Table 14.11 summarises the findings of this section on the coherence of CAP dairy policy measures with the general principles of the 2003 CAP reform. The columns relate the main principles of the reform. The rows refer to the main objectives of the changes in CAP dairy policy measures since 2002, with sub-headings for particular policies. The coding can range from three minuses to three pluses, indicating complete lack of coherence, not very coherent, slightly incoherent (or incoherent in unusual circumstances), neutral (i.e. unrelated, independent), somewhat coherent, coherent, and very coherent.

Table 14.11 Coherence between CAP reform principle and changes in CAP dairy policy

	Overall principles of the 2003 CAP reform								
Change in CAP dairy policy	**More market orientation**	**More competitive agriculture**	**Better production structures**	**Maintenance of current support levels**	**Fair producer incomes**	**Maintenance of rural areas**	**Environ-mental sustainability**	**Socio-economic sustainability**	**Policy simplification**
Switch from market price support to dairy payment	++	+	++	+++	+	+	++/-	+	+/-
Reduction of intervention prices	++	++	+	+	0/- -	0/-	+/-	0	++
Decoupling of dairy payment	+++	++	++	+++	++	-/+	+/-	-/+	+++
Introduction of cross compliance	0	0/-	0	0/-	0/-	+	+++	0	- -
Gradual increase of quota	++	++	+++	+	+	+/-	+/-	+	+
Simplification of policies (removal of redundant measures)	++	+	0	+	0	0	0	+/-	++

Key: complete lack of coherence=- - -, not very coherent = --, slightly incoherent = -, neutral (i.e. unrelated, independent) = 0, somewhat coherent = +, coherent = ++, very coherent = +++. Where two symbols are given separated by a '/', this means that the coherence rating may be one or the other, depending on circumstances.

Summary of findings for each indicator, EQ10.2

Indicator	Expected result	Evidence found
More market oriented and competitive agriculture • *Market outcomes*		
Comparison of internal and international prices	International competitiveness was expected to improve. A necessary condition for this result is that average cost across the sector should fall or shift improved.	The evidence found was insufficient to allow a conclusion to be drawn. No evidence was found that the necessary condition was met.
Presence of imported dairy products on EU market	Greater competitiveness of EU production means selling into the EU market is less attractive.	Lower fill rates of TRQs, and falling total exports, during 2004-6 support this expectation.
Share of dairy exports without export refund	Greater competitiveness should increase the share of exports without a refund.	Evidence was found of a gradually increasing share of cheese exported without refund. Evidence for other products is inconclusive.
EU presence on world market	More competitive milk production should (ceteris paribus) increase the EU's world market share.	Evidence is inconclusive.
• *Structures*		
Economies of scale in milk production	Previous trends in these indicators were expected to continue. An acceleration of any of these trends could be attributed to the 2003 policy changes.	Continuing trends were found, accelerating for specialist dairy farms.
Economies of scale in milk processing		Mixed evidence.
Extent of specialisation		Trends were maintained in EU-15, at different rates in Member States depending on the current extent of specialisation. No clear trends in EU-10.
Maintenance of income support at current level		
Evolution of total support to producers	The total cost of income support (from consumers as well as from the budget) was expected to fall with the 2003 policy decision to shift some support from market intervention to a direct income payment. This expectation is based on the theoretical and empirical economics literature, according to which direct income support is a more efficient measure for support producer incomes.	The expected result was confirmed.

Table continues on the next page.

Fair producer incomes		
Annual income trends	In order to fulfil the criteria chosen for assessing fairness, income trends, and income relative to other types of farm should be maintained.	The evidence shows that income trends continued unchanged post-2003.
Variability of milk price		There was little change in price volatility during 2004-2006. In 2007-2008, large increase in milk price volatility were observed, due to the combination of exogenous events and new conditions created by the 2003 reforms.
Stabilising effect of direct payments on dairy income		Favourable evidence reported, slightly reducing the impact of more volatile market price on income.
Relative income		Dairy income relative to that of other farm types has been maintained.
Sustainability of agriculture • *Environmental sustainability*		
Environmental footprint of aggregate milk production	Expected to fall, due to structural changes and yield increases.	Expectation confirmed.
Production intensity	Expected to fall, since the decoupled payment reduces the incentive to maximise yields.	An increasing trend towards intensification was found, but at a slightly slower rate post-2003.
Dairy farmers' participation in agri-environmental schemes	No prior expectation.	Strong evidence of dairy farmers' participation in agri-environmental schemes was found, especially in LFAs.
Milk production in LFAs	Expected to come under pressure from more market-oriented policies, but this pressure to be counteracted by LFA payments.	Evidence was found to support the expectation, but not in all regions.
• *Socio-economic sustainability*		
Human capital in dairy farming (entry of young farmers)	No prior expectations: lower quota values could offer more favourable conditions for young dairy farmers to start, whereas lower milk prices and greater uncertainty could act as a deterrent.	Strong evidence was found of a lower rate of entry of young dairy farmers, and increasing age structure, particularly since 2005.
Administrative simplification		
Trend in administrative input	It was expected that savings would result from (a) the abolition or suspension of some measures, and possibly (b) the simplification of on-going measures.	Evidence was available from only two Member States. It confirmed expectation (a), but could not shed light on expectation (b). The available evidence is insufficient to support a general conclusion applicable to all EU Member States.

15 EQ11: Relevance

To what extend have the CAP measures applicable to the dairy sector been relevant with respect to the needs and problems of farmers, processors and consumers?

15.1 Approach to answering EQ11

15.1.1 Interpretation and comprehension of the key terms of EQ11

This question requires the CAP measures applicable to the dairy sector to be evaluated with respect to the needs and problems of the main stakeholder groups influenced by dairy policy.

As explained in the evaluation methodology, questions of relevance are important in ex ante evaluations where strategic issues and how they are mapped into policy instruments are under discussion and can be modified.[116] In a retrospective evaluation it is possible to examine whether the needs and the problems of the main stakeholder groups have actually been addressed by the policy. The initial step is therefore to identify the stakeholder groups and to list their concerns. Such a list is derived here partly from the recitals in the legislation, or what is implicit in the recitals, and also in part from extensive background knowledge about the sector and the dairy policy context. Based on this list, the analysis explores to what extent the policy impacts have delivered results in response to these needs, and whether particular stakeholder groups have grounds for being more satisfied with the outcomes than others. This involves designating one or more indicators that reflect policy outcomes and are also associated with specific stakeholder concerns.

The question explicitly mentions farmers, processors and consumers as the groups most involved. However, in order to encompass all the objectives and the changes realised, several other groups (taxpayers, and 'beneficiaries of the environment' – that is, current and future citizens of the EU and beyond) should also be mentioned.

For the purposes of this evaluation, four stakeholder groups are therefore distinguished: milk producers, milk processors, consumers of dairy products, and 'society' (comprising people in their roles other than dairy product consumer, namely as taxpayer and citizen). For each of these groups, a number of commonly expressed concerns are identified, namely:

Milk producers: level and stability of income, administrative burden, constraints on production choices, constraints on expansion,

Dairy processors: milk prices, availability and stability of raw milk supplies,

Dairy product consumers: consumer prices,

'Society': environmental sustainability, animal welfare, GHG emissions and climate change, food security, cost of the CAP, cost of agricultural policies.

It is clear that there are trade-offs between different stakeholder needs (in certain cases, maximising the perceived needs of one group may be incompatible with doing the same with respect to other needs of a different group). There are also limits to what can be delivered by policies. For example, consumers want cheaper food, many also want higher-quality food, whereas others (and maybe some of the previous groups), in their role as 'citizens', also want their food to be produced in a more environment- and animal-friendly way. If the most recent changes in dairy policy have not been able to deliver undisputed improvements with respect to all these needs, it may not be because the policies lack relevance but

[116] "Handbook on Common Monitoring and Evaluation Framework Guidance Document" (DG AGRI, 2006) Glossary (p.14).

perhaps because the internal constraints linking these objectives make it impossible to maximise across them all at the same time. Similar trade-offs exist between the commonly perceived needs of producers and processors, and there are limits to what dairy policy can deliver with respect to curbing the methane emissions of dairy cows, without which there would be no dairy products at all.[117] When interpreting the findings relating to relevance, these issues need to be taken into account.

15.1.2 Methodology used for answering EQ11

The methodology adopted here consists in assembling all the evidence presented in earlier EQs, structuring it according to the stakeholder groups and their particular concerns, and making a synthetic summary in table form. Very few new indicators are used and little new material is provided. This methodology is entirely appropriate for addressing the issue of relevance ex post. If material on the effectiveness and efficiency of CAP dairy policy were not adequate or not appropriate for assessing the extent that the policies have met relevant needs, then a priori this would indicate a poor match between the objectives, instruments and impacts of the policy on the one hand, and the needs and problems of the stakeholder groups on the other.

15.1.3 Judgement criteria, indicators and judgement criteria used for each indicator

The indicators used to answer this EQ are set out in Table 15.1.

Table 15.1 Judgement criteria and indicators for EQ11

Indicator	Data requirement	Information sources
Milk producers		
Level and stability of income	Evidence presented for EQ2, EQ3, EQ5 and EQ10.2	This report
Administrative burden	Evidence presented in EQ9	This report
Constraints on production choices	Evidence on cross compliance costs presented in EQ10.1 Impact of decoupling	This report
Constraints on expansion	Future evolution of the quota scheme (Table 2.38, EQ9)	This report
Processors		
Milk prices Product prices	Evidence presented in EQ2 and EQ5	This report
Stability of raw milk supplies	Evidence presented in EQ1	This report
Consumers		
Consumer price	Reduction in support coming from consumers Evidence on price transmission	EQ9 DG AGRI report on price transmission
'Society' (citizens, taxpayers etc)		
Environmental sustainability	Indicator(s) calculated for EQ10.2	This report
GHG emissions	Dairy cow trends (EQ10.2)	This report
Cost of the CAP	Evidence from EQ9	This report
Administrative costs of agricultural policies	Conclusion reached in EQ9	This report

New judgement criteria will not be used for each indicator separately. Instead, the judgement already reached regarding the indicator when used earlier in the report will be carried over to this EQ. The judgement criteria for assessing the overall impact on stakeholder need and problems involve considering all the main changes in terms of their ability to meet stakeholder concerns, and drawing conclusions from the picture that emerges.

[117] However, it would still be within the scope of dairy policy to create incentives for producers to adopt production and feeding systems, dairy breeds, etc., that minimise these emissions, given the current state of our technological knowledge.

15.2 Milk producers

15.2.1 Level and stability of income

Evidence presented in EQ3 shows that trends in producer income have been maintained and that the position of dairy farmers relative to other types of farming has not deteriorated.

As argued in EQ10.1 based on evidence from EQ2, EQ3 and EQ5, the post-2003 configuration of policy measures revealed itself inadequate for shielding EU markets from the world market turbulence of 2007-2008. Prices for raw milk and for dairy products in wholesale markets rose close to or at times above world market price levels, and the volatility of these prices on a monthly basis was comparable with that of world market prices. However, the increased share of direct payments in the income of farmers from 2004 onwards (fully achieved by 2007) meant that a smaller proportion of their income was vulnerable to this volatility. Clearly, the 'cushioning' provided by direct payments was not enough to meet milk producers' expectations or to allay their fears, and they expressed their concerns very forcefully, particularly during the sharp downturn in prices in 2009.. If a similar episode of high and volatile world market prices should occur again, the same impacts are likely to be felt in the EU dairy sector.

15.2.2 Administrative burden

The administrative burden for milk producers due to the CAP has increased. This was to be expected, given the way policies have been evolving (in particular, the shift away from price support and towards targeted transfers to particular groups who have to justify their eligibility for payments and their compliance with the payment conditions). This increase was confirmed by the producer survey (see EQ9). Much of the perceived increase has been due to environmental restrictions (mainly associated with cross compliance) and relatively little of it (according to respondents) from the payment mechanism associated with the SPS/SAPS.

15.2.3 Constraints on production choices

The issue here is whether cross compliance places new constraints on production methods or technologies. Producers were asked about the costs of cross compliance, and virtually all replies concerned investment costs (adaptation of buildings, waste storage, animal eartags and so on) but virtually nothing about costs of being obliged to produce in milk on a different way. A question asking specifically about this potential effect was not directly asked in order to avoid any bias that may have arisen by appearing to expect or solicit the reporting of such an effect. Instead, a more general and open-ended question was asked about the "costs of cross compliance", which allowed producers themselves to identify the costs they had faced. In the replies given to this question, there was no mention of constraints on production methods.

As regards constraints on the choice of *what to produce*, it is clear a priori that the decoupling of the dairy premium removes a constraint on producers' choices, as it is no longer necessary for them to hold quota at the end of the current year in order to receive the payment. There was little evidence that this acted as an incentive to quit dairying, although common sense suggests that if there are other reasons for wanting to quit, the decoupling of the payment may facilitate the decision. There are also no signs whatsoever that the decoupling has acted as an incentive for milk producers to continue to produce milk but at a lower level, whilst diversifying into other commodities. On the contrary, all the signs are that milk producers are still seeking economies of scale through herd-size expansion, and that the share of milk coming from specialist dairy farms (i.e. those for whom more than two-thirds of their gross margin comes from dairying) is increasing. However, it is also true that decoupling has removed a (potential) constraint on producer choices that may be relevant for a minority of producers.

15.2.4 Constraints on expansion

Table 2.38 shows the planned levels of national quota ceilings up to abolition in 2015. It shows that already (since 2008) quota ceilings are higher and that across the EU quota will become even more available before 2015. In 2010, all but two Member States had delivery levels below their national ceilings, indicating that at national levels for that year, quota availability was no longer a constraint on production. Despite this development, even in 2009/2010, there was still a small price for quota purchase (see Table 13.9) by producers not wanting to face the risk of having to pay the superlevy when expanding production. Overall, however, many producers in different parts of the EU are already operating without an effective quota constraint, as a result of the changes decided in the 2003 dairy policy reform or subsequently.

15.3 Processors

15.3.1 Milk prices

The switch of some producer income support out of the milk price and its replacement by a direct payment has undoubtedly lowered the price that processors need to pay for raw milk, ceteris paribus. Figure 6.1 shows that the underlying trend in milk price between 2004 and 2006 was indeed downwards (following the phased reductions in intervention prices). In the following period (2007-9), price levels and movements were severely disrupted by market instability. However, one can expect that the advantage to processors of lower milk prices will persist in more normal conditions. This observation was made by some of the respondents to the processor survey.

15.3.2 Product prices

Product prices were expected to be affected in a downward direction by the lowering of intervention prices. This has turned out to be the case for butter (see Figure 9.1). However, the price of the other intervention product, SMP, remained rather steady during 2004-2006, as did that of WMP which often serves as an alternative on the production side to butter and SMP (see Figures 9.3 and 9.5). In the case of cheddar cheese (chosen as a representative cheese), prices did fall slightly during 2004-2006. It should be noted that between 2003 and 2006, there was a noticeable decline in expenditure on cheese export refunds (see Figure 13.3), which could explain the slightly declining internal price.

15.3.3 Availability and stability of raw milk supply

In principle, the dairy policy changes under review should improve the availability of raw milk for processing, for the same reasons given in section 15.2.4 above. Of course, whether this occurs will depend on the milk price and whether it is high enough to keep production at current levels and to encourage producers to expand further when they are no longer constrained by quota. If this does not happen (indeed, some models suggest that after quota abolition prices may fall low enough that the production increase will be quite limited[118]), then local shortages could develop. Recent discussions have focussed on a possible imbalance of bargaining power between producers and milk processors in various EU Member States. To the extent that this occurs, the milk price may be forced below its level would be in competitive conditions, and both market *and* policy signals received by producers are distorted. As the sector becomes more market-oriented, the role played by price becomes more important, so that if processors find they are facing a tight market for raw milk supplies, they will have to use price increases to secure the supplies they need.

Regarding stability of supply, the recent reduction in supply in some Member States has prompted the question as to whether they are ‘cyclical’ variations or one-off, irreversible reactions to the combination of policy changes and market turbulence of recent years. In general, it can be expected that, as constraints are removed and the dairy sector becomes more market-oriented, total supply becomes less predictable than it was before the 2003 reforms. Here again, processors can make greater use of proven mechanisms (such as long-term contracts) to remedy the situation. A potential concern is that if market power is unequally distributed between processors and producers, the terms of such contracts may be unfavourable to producers. It is therefore important that forms of contract are used that preserve producers’ access to a share of any income gain due to higher prices in product markets in return for bearing the risk of loss from variability of milk production conditions.

[118] See for example Witzke and Tonini, 2008.

In general, given the nature of the production processes involved and the specificity of the investments in milk production, large year-on-year variations in supply are very unlikely. It is interesting to note that respondents to the processors' survey did not consider that any of the policy changes *relating directly to dairy farmers* would impact on stability of supply.

15.4 Consumers

15.4.1 Consumer price

Since the dairy policy measures under review do not directly target consumer markets, none of the indicators used for other EQs can shed light directly on the extent to which the 2003 reforms have responded to the consumer's wish for reasonable product prices. What *has* been established is that some income support has been shifted out of wholesale product prices into direct payments by reducing the support to intervention products (this was called in EQ9 a reduction in the 'consumer transfer'). However, it is not guaranteed that the lower wholesale price was transmitted to the price paid by final consumers.

A recent study[119] of price transmission along the supply chains for a number of food products in some Member States concludes that the dairy supply chain is one of the cases where price transmission works least well. Among the conclusions of this report is the finding of "asymmetric behaviour across the dairy chain where dairy consumer prices have been fast to increase, but slow to decline in the wake of the sharp drop in milk producer prices (e.g. Slovenia, United Kingdom, Denmark, Lithuania). Furthermore (this) price transmission pattern in the dairy sector has significantly strengthened since the commodity price surge in 2007" (p.56). Moreover, for some dairy products, the typical delay between a fall in milk price and a downward reaction of consumer price could be 12 months, and tends to be longer in the EU-12 countries examined than for the EU-15 countries considered.

It is an integral part of the objective to improve market orientation that *all* segments of the chain should share in the benefit from the resulting efficiency gains. In fact, it is inconsistent with the principle of market orientation that price transmission between any particular segments of the chain should be impeded.

This is an unresolved issue where not only more empirical analysis is needed but also more attention to effective policy design. To understand and measure the extent of price transmission (in either direction) along the entire length of the supply chain between primary producer and final consumer requires a perspective that embraces the whole chain. Such a whole-chain perspective is also needed in order to formulate appropriate policies about price transmission or to make recommendations for ensuring its smooth functioning. Given that price transmission along the supply chain is not part of the remit of CAP dairy policy, this issue is not directly addressed in the present evaluation study. However, in this evaluation question, where the relevance of EU dairy policy to the main stakeholder groups in society is under discussion, it is very important to point out that price transmission is one of the two crucial links between policies targeting the milk-producing sector (both as regards their objectives and the instruments used) and the interests of consumers.[120] If price transmission is not working well, two negative consequences of direct relevance to this evaluation may arise. First, instruments that operate at intermediate stages in the chain downstream from milk producers (such as the intervention system) but which are intended to affect outcomes in the milk-producing sector may be prevented from achieving their aims. This issue has already been discussed in Chapters 4 and 6. Second, consumers may not benefit from efforts to achieve greater efficiency in milk production, whether these efforts are market- or policy-driven.

[119] European Commission (2009). Analysis of price transmission along the food supply chain in the EU. Commission Staff Working Document, SEC(2009) 1450.

[120] The other link concerns product quality, and the preservation of its integrity, as regulated at the raw milk stage, along the entire chain to consumers. Quality issues are not the focus of this evaluation, and it assumed throughout that this aspect of consumer concerns presents no issues product quality

15.5 Society

15.5.1 Environmental sustainability

In EQ10.2, several indicators relating to the incentives for environmental sustainability provided by CAP dairy measures were assembled. A priori, when some income support is shifted from price (which means total income support is less dependent on the quantity produced) and is paid as a guaranteed fixed amount, this should lessen the incentive to push for yield increases and to intensify the use of fixed resources (cows, land, labour). Nevertheless, the evidence reviewed suggests that the policy changes have not lessened the incentive to produce more intensively in EU-15 Member States, and that there was a risk of increasing environmental problems in areas where dairying becomes more concentrated. At the same time, cross compliance requirements and the relatively high participation rate of dairy farmers in agri-environmental schemes may help to off-set any potential environmental degradation that might occur because of greater intensification.

15.5.2 GHG emissions

In contrast to the general concern about resource use and the environment, EQ10.2 concluded that although the level of milk output has remained relatively constant, emissions of methane *per tonne of milk produced* have fallen thanks to the on-going decline in the number of dairy cows in EU27. This is largely due to the secular increase in milk yields. Establishing a link between this trend and the 2003 policy reform would involve demonstrating a link between the new policy signals, a growth in the share of milk coming from specialist dairy farms (where milk yields are higher) and the rather small increase in the rate of decline of dairy cows since 2003. As already demonstrated in earlier chapters, the empirical evidence supporting this causal chain is weak.

15.5.3 Cost of the CAP

The evidence presented in EQ9 shows that the total cost to society of dairy support has been falling, and this is true even when the decoupled 'ex-dairy premium' (now part of the SFP) is also included in the calculation. However, the conclusion relies on the savings in the 'consumer transfer' component of total cost being acknowledged, and for this fall to be shared widely across social groups it requires that consumers should benefit from the market price reductions for dairy products at the wholesale level. In order for the wider societal benefit of the 2003 dairy reform to be appreciated, not only does the shift from more costly support (in social terms) via the market to more efficient support via direct payments need to be explained to the wider public, but more importantly the lower prices on which this benefit rests actually have to reach final milk consumers. This point is closely linked to the argument presented in 15.4.1.

15.5.4 Administrative costs of agricultural policy

Examination of the cost of public administration relating to dairy policy in EQ9 was based on the experience of only two Member States[121], and therefore had to remain inconclusive as regards the EU as a whole. In the two cases examined, the tentative conclusion was reached that public administrative savings through the simplification of policies and their implementation had been delivered by the 2003 reforms. However, other stakeholder groups (farmers, milk processors) also bear part of the policy implementation cost in the form of (unpaid) administrative tasks. The milk producer survey found that farmers perceived the administration burden of dairy policy to have increased since 2003, whereas the perception of milk processors was mixed depending on the type of marketing activities (e.g. exporting or producing solely for the domestic market) or product mix (e.g. focus on basic (intervention) products, or on PDO cheese) undertaken by the firm.

The difficulty experienced by the evaluation team in finding more extensive hard evidence on public administration costs of these policies is symptomatic of the lack of transparency surrounding this item of

[121] The relevant administrations in Member States where case studies were performed were contacted with the request to provide information on administration costs. Despite follow-up approaches, only two Members States provided information that could be used to address this part of the evaluation question.

policy cost. Unfortunately, this lack of transparency can provide fertile ground for the propagation of unrepresentative anecdotes alleging administrative inefficiency in implementing CAP procedures, which may lead to a perception of inefficiency that is largely unfounded. The general public (taxpayer and citizen), as well as the image of the CAP, would benefit from more transparency and more rigorous measurement of administrative costs than seems to exist at present.

15.6 Conclusions

Table 15.2 gives a summary of the points raised in this section. The scoring conventions used are those adopted for Table 14.11 in EQ10.2. The scores and the density of the remarks in the table suggest that milk producers and society at large are the two groups most affected by CAP dairy measures. However, it needs to be borne in mind that for society, what happens in the EU dairy sector is just one of many other pressing and not so pressing concerns, whereas for milk producers it is an important factor in determining their livelihood, the future for their families, the way they spend their working time, and is clearly of utmost importance to them.

Table 15.2 Summary of CAP dairy policy measures according to how their outcomes have responded to stakeholder concerns

	Stakeholder Group			
Policy change	**Milk producers**	**Processors**	**Consumers**	**Society**
Package of changes involved in switching from market price support to a decoupled payment (including lower prices and more visible support through budget payments)	+++ (income levels maintained) ++ (more flexible production choices without losing support entitlement)	+ (lower prices for raw milk, but also potentially lower prices for processed products)	++ (potentially lower prices, BUT receiving them depends on price transmission along the chain)	+++ (the package is more efficient) - (cost becomes more visible as a budget item and hence needs to be properly explained)
Introduction of cross compliance requirements for milk producers	- - (investment costs, greater administrative burden)	0	0	++ (makes dairying more environment-ally friendly, helps to gain support for the CAP among the wider public)
Gradual increase and then abolition of quotas	++ (more scope for expansion, scale economies)	+ (more abundant milk supplies)	0	? (fear of negative environmental consequences, disappearance of dairy farming in mountain areas/ family farms)
Reduction of intervention to a safety net	- - (greater risk of price instability)	- (greater risk of price instability)	0	+ (large intervention stocks often seen negatively by society)
Simplification of policies	- Milk producers perceive greater complexity rather than simplification	+ (depends on the type of activities of the company)	0	? Difficult to obtain a balanced picture, more transparency needed

Key: ---, --, and – indicate that the outcome has been contrary to one or more of the concerns of a particular stakeholder group, with the number '–'s indicating the degree to which this has occurred; 0 indicates that the outcome of the particular measure has been largely unrelated to the concerns of the corresponding stakeholder group; +, ++, +++ indicate that the outcome has been met or been supportive of one or more concern of the stakeholder group. '?' indicates that conflicting tendencies, or insufficient evidence to conclude.

Consumers are the stakeholder group with the fewest impact items, and yet the one issue registered for them (price falls and their transmission to final consumers) is crucial. Milk and dairy products are consumed daily by most people, and the expenditure of a typical family on dairy products over the year is significant. Although all the stakeholder groups score at least one '+' in the first row of the table (switch in delivery mechanism of income support), this element of the policy package can only be considered an unqualified success if the benefit of the increased efficiency reaches consumers at the end of the chain.

16 Conclusions and recommendations

The evaluation examines the effectiveness, efficiency and relevance in relation to their objectives of CAP measures applied to the dairy sector since the 2003 CAP reform. The main conclusions, organised by objective, by evaluation question and by instrument (with respect to effectiveness) are presented below. More details can be found in the conclusions provided at the end of each chapter. Recommendations are made at the end of this chapter.

16.1 Conclusions with respect to policy objectives

The policy objectives of the CAP on milk and dairy products are summarised as: (1) market performance (market balance and market stability), (2) producer income, (3) competitiveness and market orientation, (4) structures and structural change, (5) policy simplification, and (6) other objectives (environmental standards, product quality, maintenance of rural areas, rural employment). Table 16.1 provides an overview of the impact the 2003 CAP reform on those objectives.

Table 16.1 Summary of findings with respect to the policy objectives

Policy objective	Result achieved
1 Market performance	
1a Market balance	• Domestic supply became more responsive to milk prices • The structural excess supply of both milk and dairy products declined from 2004 onwards. This can be attributed to the shift of income support from price to direct payments, the reduction in intervention for butter and skim milk powder and the abolition of the target price for milk
1b Prices and price stability	• Prices for dairy products stayed relatively stable during 2003-2006, with the exception of the butter price, which started to decline after 2004 • The raw milk price declined during 2003-2006, following (less steeply) the decline in intervention prices. • The high prices in world dairy markets during 2007-2008 led to elimination of the price gap • The increasing turbulence of world market prices during 2007-2009 increased the volatility of EU milk and dairy prices • The traditional stabilisation measures (export refunds and intervention buying) are no longer operational when the EU internal prices converge with the world market prices, and in this context, ensuring price stability is more difficult • The scaled-down intervention system, with its basic structure designed to cope with seasonal imbalances, did not act sufficiently quickly or effectively as a safety net during the period late-2008 to late-2009, despite extra measures adopted during 2009
2 Producer income	• Milk producer income has been maintained and continues to follow its longer run trend • The profitability of dairying relative to other commodity sectors has developed favourably

Table continues on next page

Policy objective	Result achieved
3 Competitiveness and market orientation	• Market orientation has improved. The decline in intervention prices increased the role of market signals, but little evidence was found that more reliance on direct payments increased farmers' flexibility with respect to production decisions • The price gap with the world market has substantially declined for all dairy products since 2003, due to slight falls in domestice prices and increasing world prices; however, only unsubsidised exports for cheese have increased • During the evaluation period, the EU was not competitive on world markets except during the commodity boom of 2007-8 • Cost-competitiveness did not improve and the share of milk from farms with milk was profitable declined between 2003-2007
4 Structures and structural change	• Structural change in the primary sector continued in all Member States and contributed to the maintenance of farm income per annual work unit; however, this cannot be linked to specific CAP dairy measures • The consolidation process in the dairy processing industry continued with mixed results in terms of the average scale increase
5 Policy simplification	• Milk producers perceived an increase in their administrative burden; a majority of dairy processors considered that their administrative burden had become lower[1]
6 Other objectives	• The on-going decline in the number of dairy cows, whilst the level of milk output remained steady, has reduced the emission of methane both in an absolute sense as well as per tonne unit of milk produced • Cross-compliance has improved the incentives for sustainable milk production • Intensification of production in EU-15 has continued to increase but at a slower rate, and the risk of additional pressure on the environment in areas where dairying is becoming more concentrated remains; no clear evidence of a shift of production from less marginal to more competitive areas • The average age of EU milk producers has risen faster than that of EU farmers generally, which in the longer run will have an impact on the formation of human capital and entrepreneurship in the dairy sector

Notes: 1) These conclusions are based on the case study surveys done in 11 Member States among 13 regions and should be taken with due care because being based on small and non-representative samples

16.2 Conclusions with respect to the evaluation questions

Table 16.2 summarises the main conclusions with respect to the 11 evaluation questions. The answer to each evaluation question is based on the evidence gathered with respect to a set of empirical indicators.

Details of the results by indicator are tabulated at the end of the concluding section of the each evaluation question chapter.

Table 16.2 Summary of findings with respect to the evaluation questions

EQ	Short description of key question	Main findings with keywords
1 Production and supply to / demand by dairies	To what extent have the CAP measures applicable to the dairy sector contributed to balancing supply and demand of milk and led to production restructuring?	• Domestic supply became less determined by quota ceilings and more responsive to milk prices, with quota no longer being always filled for most Member States • The shift of income support from market price to direct payments, reduced intervention for butter and SMP, and the abolition of the target price for milk led to a falling structural excess supply (from 2004 onwards) and contributed positively to balancing demand and supply • Structural changes affecting the number of dairy cows and herds, the herd-size distribution and extent of specialisation of farms in milk production have continued, but they cannot be linked to specific CAP measures studied here • Higher national quota ceilings led to greater geographic mobility of productive capacity in some Member States
2 Producer prices	To what extent have the CAP measures applicable to the dairy sector affected prices paid to producers, the payment system and price stability?	• The abolition of the target price for milk, reduction in intervention prices for butter and skim milk powder, the scaling down of consumption aids and relaxation of quota ceilings led to a reduction in commodity (and hence milk) prices and gradual convergence of the EU towards world market prices during 2004-2006 • The case study surveys suggest that the changes in CAP measures did not affect the milk payment system • In 2007-2009, the effects of the CAP measures on internal prices were masked by the price turbulence originating in the world market commodity boom • During 2007-8, which was a period of abnormally high world market prices, export refunds and intervention buying were no longer operational during the months when the world prices exceeded the intervention price levels • In 2009, on the downside of the price spike, although intervention buying-in was activated, the (average) EU-27 raw milk price fell to below €25/100 kg in June and July

Table continues on next page

EQ	Short description of key question	Main findings with keywords
3 Producer's income	To what extent have the CAP measures applicable to the dairy sector contributed to maintaining / increasing the farmers' income?	▪ Trends in dairy farm income, measured by FNVA/AWU, was maintained ▪ The profitability of dairying relative to other commodity sectors was maintained ▪ Maintenance of dairy incomes despite lower institutional prices is largely due to the role of direct payments ▪ Structural change (farm size expansion) was also a positive factor contributing to dairy farmers' income
4 Producer's competitiveness and market orientation	To what extent have the CAP measures applicable to the dairy sector contributed to increasing farmers' market orientation and competitiveness?	▪ Market orientation improved due a reduction in the price gap between the EU and world markets, weaker quota constraints and hence stronger supply response to price signals ▪ Cost-competitiveness did not improve, and the share of milk from 'profitable' milk enterprises declined after 2003 until the sharp price increase in 2007
5 Prices of milk products	To what extent have the CAP measures applicable to the dairy sector contributed to stabilising the market prices for milk products?	▪ EU dairy product prices remained stable until 2006 due to export refunds and public intervention ▪ Volatility increased after 2007 due to a commodity boom on world markets
6 Market balance	To what extent have the CAP measures applicable to the dairy sector contributed to balancing supply and demand for milk products?	▪ Structural excess supply declined for the main dairy products after 2003 ▪ The main factor driving these falls was an increase in unsubsidised demand ▪ Because of the absence of lower product prices (apart from weak evidence regarding butter), only a limited impact of policy changes could be identified
7 Structure of processing industry	To what extent have the CAP measures applicable to the dairy sector influenced structural changes in the processing sector?	▪ No strong conclusions could be drawn with respect to policy impacts ▪ Concentration and consolidation of firms increased in some Member States
8 Competitive-ness on international markets	To what extent have the CAP measures applicable to the dairy sector contributed to improved competitiveness of milk products on international markets?	▪ Price gap relative to the world market declined due to lower intervention prices for butter and SMP, and increasing world market prices ▪ The volume of unsubsidised exports of cheese increased (this holds in particular for quality and PDO/PDI cheeses) ▪ During the evaluation period, the EU was not competitive at world market prices for all products, but for some products its competitiveness has improved

Table continues on next page

EQ	Short description of key question	Main findings with keywords
9 Efficiency	To what extent have the CAP measures applied to the dairy sector been efficient with respect to their objectives?	▪ Efficiency has generally increased ▪ The total cost of dairy support policy declined whilst market balance improved and producer income levels were maintained ▪ Market orientation and sector structure improved without any related increase in policy costs ▪ There was no marked change in the competitiveness of milk or dairy products ▪ Dairy production became more sustainable but at an additional cost ▪ Price stability deteriorated, largely due to external factors, whereas costs of intervention and export refunds declined
10.1 Coherence - Rural Development Programmes	To what extent have the CAP measures applicable to the dairy sector been coherent with the rural development measures and the national aid granted in accordance with relevant EU rules stated?	▪ Good degree of coherence between the CAP dairy measures, and rural development measures and state aids ▪ Pillar 1, RDP and national aid measures operate at different levels and scales, giving them a complementary character ▪ Several synergies and one source of potential conflict between CAP dairy measures and RDP objectives were identified
10.2 Coherence – Overall CAP objectives	To what extent have the CAP measures applicable to the dairy sector been coherent with the overall concepts and principles of the 2003 reform of the CAP?	▪ A high degree of coherence was found ex post ▪ Market orientation and competitiveness improved to an extent ▪ Income support was maintained at pre-2003 levels and income trends continued unchanged post-2003 ▪ Environmental sustainability increased ▪ Socio-economic sustainability in question due to a fall in the rate of entry of young dairy farmers
11 Relevance	To what extent have the CAP measures applicable to the dairy sector been relevant with respect to the needs and problems of farmers, processors and consumers?	▪ Milk producers' concerns over income, production flexibility and expansion are met, but at the cost of a heavier administrative burden and more exposure to price risk ▪ Processors also face more price and market risk ▪ Society benefits from increased efficiency, and more focus on environmental sustainability ▪ Consumers face potentially lower product prices, but this benefit is conditional on the transmission lower milk prices along the supply chain

16.3 Conclusions with respect to the effectiveness of the instruments

The instruments of CAP dairy policy typically affect more than one objective, and in many cases more than one objective is affected by the same instrument. The examination of the effectiveness of these measures as presented in the evaluation questions is structured by target area (producer incomes, price stability) rather than by instrument. Consequently, a number of instruments appear in more than one evaluation question and their effectiveness in each evaluation question tends to be examined with respect to only one of their multiple impacts. Table 16.3 reassembles the evidence on instrument effectiveness instrument by instrument, and for some of them attempts to reach an overall assessment of how effective they have been. The 'average score' is a subjective assessment based on the distribution of the scores reported for each objective of the corresponding instrument.

Table 16.3 Summary of instrument effectiveness

Instruments	**Expected effects**	**Evidence**	**Success (scale 0 - √√√)**
Milk quota system and modifications to it	Market balance	EQ1a	√√√
	Greater confidence for processors (stability of supply, investment decisions etc)	EQ7	√√
	Relaxation of quota limits improves market orientation	EQ4	√
	Average score		**√√**
	Unintended side-effects Impedes structural change Creates winners and losers from quota trading in periods of policy transition	Investigated in EQ1b Investigated in EQ9	Not found Some evidence found
Public intervention measures for butter and skimmed milk powder and changes thereto	Use of intervention stocking → milk price stabilisation	EQ2	√√ (as long as intervention prices are higher than world market prices for butter and SMP *and* there is good price transmission from processors to producers)
	Use of intervention stocking → dairy product price stabilisation	EQ5	√√ (as long as intervention prices are higher than world market prices for butter and SMP)
	Lower intervention prices → lower milk price	EQ2	√√√
	Lower milk price → reduction of structural surplus	EQ1, EQ6	√√√
	Lower milk price → improvement in international competitiveness	EQ4, EQ8	√
	Average score		**√√**
	Unintended consequence Lower safety-net increases the probability of periods of high volatility transmission from world market to domestic prices	EQ2, EQ5, EQ9	Strong evidence found

Table continues on the next page

Instruments	**Expected effects**	**Evidence**	**Success (scale 0 - √√√)**
Mandatory and optional aid for private storage for butter, skimmed milk powder and cheese	Private storage → market stabilisation	EQ4, EQ5	0
	Deadweight Impacts would have happened anyway	EQ9	Evidence found
Disposal aids for butter and cream, SMP (manufacturing, persons, animal feed)	Well targeted to disposing of the surplus?	EQ1, EQ6, EQ9	√√
Licence system, tariff rate quotas, import duties and export refunds	Export refunds as disposal mechanism for surpluses	EQ1a, EQ6	√√√
	Export refunds as an instrument for price stabilisation of Dairy products Raw milk	EQ2, EQ5	√√√ (as long as intervention prices are higher than world market prices for butter and SMP *and* (for raw milk) there is good price transmission from processors to producers)
	Tariffs and tariff rate quotas as a precondition for maintaining higher domestic price	EQ2	√√√
	Export refunds as means of improving international competitiveness	EQ4	√√
	Export refunds as a price stabilising mechanism	EQ2, EQ5	√√√ (providing domestic prices > world market prices)
	Average score		**√√**
Single Payment Scheme (SPS) and Single Area Payment Scheme (SAPS) (with respect to beneficiaries in the dairy sector)	Effectiveness in maintaining producers incomes despite the lowering of the milk price	EQ3, EQ9	√√√
Dairy premium and additional payment	Effectiveness in compensating producers for the milk price reduction	EQ9	√√√
	Effect on structural change and the exit rate	EQ1b	√ (not included in the average score)
	Improved market orientation	EQ4	√
	Average score		**√√**
Additional payments granted in the framework of Art. 69 of Council Regulation 1782/2003 and Art. 68 of Council Regulation 73/2009	Allocation by MS to the dairy sector	EQ10	Art 69 (only one MS), Art 68 (two MS)
	Uptake by producers	EQ10	Partial evidence of strong uptake
	Effectiveness in attaining specific objectives at MS level		Not assessed

The in-depth evaluation of the policy changes has focused extensively on those measures that were introduced for the first time, or significantly adapted, in the 2003 reform and subsequent regulations. Since there have been no fundamental changes in trade policies during the evaluation period, relatively little analysis has been made of the performance of these measures. Only the role of export refunds for disposing of structural excess supply and stabilising internal prices has been well documented. However, the role of the full set of border measures (tariffs, licenses, tariff rate quotas and export refunds) should not be underestimated. The successful switch of some price support into direct income support was achieved in a context of insulation against import competition by means of tariffs and TRQs. A future Doha Round agreement can be expected to reduce this insulation significantly.

Export refunds were suspended during the high-price period 2007-8, but resumed during some months of 2009 with the re-emergence of structural excess supply. This also contributed to redressing the price slump on internal markets. However, with a future Doha Round Agreement, export refunds will also probably be abolished.

It is clear that the protection afforded by trade measures has provided a relatively stable and protected space that has facilitated the implementation of significant reforms and the sector's adjustment to them. A WTO Doha Round agreement would imply less border protection. This in turn would create new internal conditions that could prove to be less conducive to the orderly implementation of further reforms, but where further reforms might become more necessary.

16.4 Recommendations

It is assumed the EU will continue to pursue the same policy objectives as those that motivated the policy changes reviewed, and to maintain those measures that were found to have had some success in promoting these objectives. The recommendations made below are based on conclusions drawn from this evaluation regarding gaps or inadequacies in the current set of policy measures.

1. In a rapidly changing global market context with shocks potentially occurring in any period of the year, intervention price levels, buying-in periods and ceilings set some years previously in a multi-annual framework and on the assumption of internally generated (seasonal) price movements are not necessarily able to provide an effective year-round safety net. In order to operate a safety net that is relevant for a more market-oriented sector facing greater exogenously produced price volatility, a more flexible safety net is required. **To this end, we recommend the adoption of more flexible intervention mechanisms so that they can respond more quickly** *at any time of the year* **to sharp falls in market price reaching abnormally low levels.**

2. Under the reformed CAP, the probability of fluctuating prices has significantly increased. Price volatility above a certain level creates uncertainty in the market, which inhibits investment, and hampers market orientation, as farmers can no longer appropriately distinguish 'noise' from changes in underlying market fundamentals. **Therefore, it is recommended that private or public risk management tools for farmers (individually or collectively) are facilitated and/or developed that aim to enable farmers to cope with higher levels of market price volatility, so as to counteract its negative effects on sector performance.**

3. The effective operation of the EU's dairy policy with respect to its objectives relies heavily on backward price transmission in the dairy supply chain. A better balance of market power between the various actors along the supply chain, particularly between milk producers and processors, is likely to become more important with the abolition of the quota scheme. **Therefore, it is recommended that the available options for redressing power imbalances in bargaining power be actively studied.** To counteract market power imbalances, several options can be envisaged. They include creating countervailing power (within the limits allowed by competition policy), legislating for more competitive behaviour in the price formation process within the chain, or restricting the build-up of market power concentration at local and national level downstream in the supply chain using new legislation to safeguard competition in the vertical dimension.

References

Agra Europe (2010a). Milk products. Newsletter, various issues, Kent: Agra Informa Ltd Tunbridge Wells.

Agra Europe (2010b). Preserved milk. Newsletter, various issues, Kent: Agra Informa Ltd Tunbridge Wells.

Alvarez, A. and C. Arias (2003). Diseconomies of Size with Fixed Managerial Ability. American Journal of Agricultural Economics 85 (1): 134–142.

Baldock, D., J. Bartley, A. Burrell, D. Colman, K. Hart, P. Pointereau, and P. Silcock (2008). Evaluation of the Environmental Impact of Milk Quotas. Study prepared by IEEP for the European Commission, DG AGRI (contract N°30-CE-0067379/00-89, AGRI-2006-0040).

Bouamra Mechemache, Z. and V. Réquillart (2000). Analysis of the EU dairy policy reform. European Review of Agricultural Economics 27 (4): 409-430.

Bouamra-Mechemache, Z., R. Jongeneel and V. Réquillart (2008). Impact of a gradual increase in milk quotas on the EU dairy sector. European Review of Agricultural Economics 35 (4): 461-491.

Burrell, A. (1990). Les coûts de production laitière au Royaume Uni. Economie Rurale, 195: 21-26.

Burrell, A. (1997). Economic Aspects of Milk Production in the European Union. EUROSTAT. Luxembourg.

Burrell, A. (2004). The 2003 CAP reform: Implications for the EU dairy sector. Outlook on Agriculture 33 (1): 15-25.

CEAS (2000). The Environmental Impact of Dairy Production in the EU: Practical Options for the Improvement of the Environmental Impact: Final Report. CEAS 1779/BDB. Centre for European Agricultural Studies (Wye, UK) and the European Forum on Nature Conservation and Pastoralism. http://ec.europa.eu/environment/agriculture/pdf/dairy.pdf, 11/2010.

Colman, D., M. Burton, D. Rigby and J. Franks (2002). Structural change and policy reform in the UK dairy sector. Journal of Agricultural Economics 53 (3): 645–663.

COMTRADE (various years): United Nations Commodity Trade Database. United Nations.

DG AGRI (various years). Agriculture in the EU, Statistical and Economic Information Report various years. Directorate-General, Agriculture and Rural Development, European Commission, European Union, Brussels.

DG AGRI (2006). Handbook on Common Monitoring and Evaluation Framework Guidance Document. Directorate-General Agriculture and Rural Development, European Commission, European Union, Brussels. http://ec.europa.eu/ agriculture/rurdev/eval/guidance/document_en.pdf, 05/2011.

DG AGRI (2011). Oral information on calculating the raw milk equivalent price. Directorate-General, Agriculture and Rural Development, European Commission, European Union, Brussels.

DG AGRI (unpublished). Information on budget expenditure and export subsidies. Directorate-General, Agriculture and Rural Development, European Commission, European Union, Brussels.

DG AGRI AgriView (various years). EU market prices for representative products. Directorate-General Agriculture and Rural Development, European Commission, European Union, Brussels. http://ec.europa.eu/ agriculture/markets/prices/eu_market_prices_for_representative_products_en.pdf, 05/2011.

DG BUDG (various years). EU budget. Directorate-General for Budget, European Commission, European Union, Brussels.

Elbersen, B and R. Jongeneel (eds.) (2010). Final report of CCAT project results (Deliverable 2.8). ALTERRA-WUR. Wageningen. http://www.ccat.wur.nl/NR/rdonlyres/14A64131-DD4E-46FD953E986DDD B2AEC1/113043/D2_8_Final_ report_V5_compr.pdf, 03/2011.

EU-FADN (various years). Farm Accountancy Data Network, Database. Directorate-General, Agriculture and Rural Development, European Commission, European Union, Brussels.

European Commission (2004). Evaluating EU Activities: A Practical Guide for the Commission Services. Directorate-General for Budget, European Union, Brussels. http://ec.europa.eu/dgs/secretariat_general /evaluation/docs/eval_activities_en.pdf, 05/2011.

European Commission (2006). EC External Services Evaluation Unit, Outcome and Impact Level Intervention Logic & Indicators: Methodological Approach. Directorate-General Development and Cooperation – EuropeAid, European Union, Brussels. http://ec.europa.eu/europeaid/evaluation/ methodology/methods/mth_log_en.htm, 05/2011.

European Commission (2008). Milk sector –(5) Impact on milk margins of a price reduction; Complements on national aids. Unit on Microeconomic analysis of EU agricultural holdings, Directorate-General Agriculture and Rural Development, European Union, Brussels.

European Commission (2009a). Contractual relations between milk producers and dairies – Summary of contributions and tentative conclusions. MK D(2009), Directorate-General Agriculture and Rural Development, European Union, Brussels. http://ec.europa.eu/agriculture/markets/milk/hlg/com2_ms_ contrib_contract_en.pdf, 05/2011.

European Commission (2009b). Analysis of price transmission along the food supply chain in the EU. Commission staff working document SEC(2009) 1450, European Union, Brussels. http://ec.europa.eu/ economy_finance /publications/publication16067_en.pdf, 05/2011.

European Commission (2010a). Report from the European Commission and the European Parliament and the Council: Evolution of the Market Situation and the Consequent Conditions for Smoothly Phasing Out the Milk Quota. COM (2010) 727 final. European Union, Brussels.

European Commission (2010b). EU dairy farms report 2010 based on FADN data. Unit L3 D(2010). Directorate L. Economic analysis perspectives and evaluations, Directorate-General Agriculture and Rural Development, European Union, Brussels. http://ec.europa.eu/agriculture/rica/pdf/dairy_report_2010.pdf, 05/2011.

European Commission (2010c). Register of State Aid Cases. Directorate-General Competition, European Union, Brussels. http://ec.europa.eu/competition/state_aid/register/, 05/2011.

Eurostat (various years). Database on Agricultural Statistics, Milk and Milk Products. http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database, 05/2011.

Eurostat FSS (various years). Farm Structure Survey Statistics. Eurostat.

FAPRI (2011). World Agricultural Outlook. Food and Agricultural Research Institute, Iowa State University, Iowa.

FAO (2010). Greenhouse gas emissions from the dairy sector: A life cycle assessment. FAO, Animal Production and Health Division, Rome.

Hanf, C. H. (1989). The impact of milk quotas on milk production and milk processing in Germany: some selected aspects. In Burrell, A. (ed.), Milk Quotas in the European Community. CAB International: 75-88.

Hennessy, D.A. (1995). Quotas, Alternative Technologies and Immiserisation. Canadian Journal of Agricultural Economics 43: 203-208.

Holt, M. T. and S. V. Aradhyula (1990). Price Risk in Supply Equations: An Application of GARCH Time-Series Models to the US Broiler Market, Southern Economic Journal, 57 (1): 230-242.

Hüttel, S. and R. Jongeneel (2011). How has the EU milk quota affected patterns of herd-size change? European Review of Agricultural Economics 38: 407-527.

IDF (2010). Methods for calculating milk equivalents. Bulleting of the IDF 390: 4-15.

IDF (2009). Bulletin of the International Dairy Federation 438/2009.

ILO (various years). Labour Statistics Database. International Labour Organisation, Geneva.

Ingco, M. (1996). Tariffication in the Uruguay Round: How much liberalisation? The World Economy: 434-5.

Jongeneel, R. and A. Tonini (2009). The impact of quota rent and supply elasticity estimates for EU dairy policy evaluation: a comparative analysis. Agrarwirtschaft 58 (5/6): 269-278.

Jongeneel, R. and A. Tonini (2008). Dairy Quota and Farm Structural Change: A Case Study on the Netherlands. In: Proceedings of the 107th EAAE Seminar, 29 January – 1 February, Seville, Spain.

Jongeneel, R., F. Brouwer, M. Farmer, R. Müssner, K. de Roest, X. Poux, G. Fox, A. Meister, Z. Karaczun, J. Winsten and C. Ortéga (2007). Compliance with mandatory standards in agriculture; A comparative approach of the EU vis-à-vis the United States, Canada and New Zealand., Rapport 6.07.21, LEI, The Hague. http://www.lei.dlo.nl/publicaties/PDF/2007/6_xxx/6_07_21.pdf, 05/2011.

Jongeneel, R., N. Longworth and S. Hüttel (2005). Dairy Farm Size Distribution in East and West: Evolution and Sensitivity to Structural and Policy Variables: Case-Studies of the Netherlands, Germany, Poland, and Hungary. Paper presented at the 107th Seminar of the European Association of Agricultural Economists (EAAE), 29 January – 1 February, Seville, Spain.

JRC-IPTS (2006). Project "Food Quality Assurance and Certification Schemes Managed within an Integrated Supply Chain", Case study on Parmigiano Reggiano. Institute for Prospective Technological Studies, Joint Research Centre, European Commission, Seville. http://foodqualityschemes. jrc.ec.europa.eu/en/documents/Casestudies_8-ParmigianoReggiano.pdf, 07/2011.

Keane, M. and D. O'Connor (2009). Price volatility in the EU dairy industry: Causes, consequences and coping mechanisms. Report prepared for the European Dairy Association, Brussels, http://www. euromilk.org/upload/docs/Homepage/Volatility%20Report_FINAL_091005%5B1%5D.pdf, 05/2011.

Keeney, M. (2000). The distributional impact of direct payments on Irish farm incomes. Journal of Agricultural Economics, 51 (2): 252-263.

Lehtonen, H. (2007). Impact of Phasing out Milk Quotas on Structure and Production of Finnish Dairy Sector. MTT Agrifood Research Finland, Economic Research. Paper presented at the 107th Seminar of the European Association of Agricultural Economists (EAAE), January 29 – February 1, Seville, Spain.

LTO (2003, 2005, 2009). LTO International Milk Price Comparison. LTO Nederland.

Mukhtar, S. M. and P. J. Dawson (1990). Herd Size and Unit Costs of Production in the England and Wales Dairy Sector. Journal of Agricultural Economics 41: 9-20.

O'Connor, D. (2006). Price Transmission in the EU Dairy Industry, Unpublished Doctoral Thesis UCC.

O'Connor, D. and M. Keane (2011). Empirical issues relating to dairy commodity price volatility. In: Piot-Lepetit, I. and R. M'Barek (eds) Methods to analyse agricultural price volatility. Springer, New York, Dordrecht, Heidelberg and London.

OECD (2005). Guidelines for Collecting and Interpreting Technological Innovation Data, The Oslo Manual, 3rd Edition. Organisation for Economic Cooperation and Development, Paris.

OECD (2010). Price Volatility and Price Transmission. In: OECD (ed.) OECD-FAO agricultural outlook 2010-2019. Organisation for Economic Cooperation and Development (Paris) and Food and Agricultural Organisation of the United Nations (Rome).

OECD-FAO (2011). OECD-FAO agricultural outlook 2011-2020. Organisation for Economic Cooperation and Development (Paris) and Food and Agricultural Organisation of the United Nations (Rome).

Petit, M., M. de Benedictis, D. Britton, M. de Groot, W. Henrichsmeyer and F. Lecchi (1987). Agricultural policy formation in the European community: The birth of milk quotas and CAP reform. New York: Elsevier.

Productschap Zuivel (2011). Oral information on calculating the raw milk equivalent price.

Rasmussen, S. and A. H. Neilsen (1985). The Impact of Quotas on the Optimal Adjustment of Milk Production at the Farm Level. European Review of Agricultural Economics 12(4): 351-64.

Réquillart, V., Z. Bouamra-Mechemache and R. Jongeneel (2008). Economic analysis of the effects of the expiry of the EU milk quota system – Final Report. Institut d'economie industrielle.

Richards, T. and S. Jeffrey (1997). The effect of supply management on herd size in Alberta dairy. American Journal of Agricultural Economics 79: 555–565.

Sutton, J. (1991). Sunk Costs and Market Structure, Price Competition, Advertising, and the Evolution of Concentration. Cambridge, Maas: MIT Press.

Tacken, G. M. L. (2009). Competitiveness of the EU dairy industry. Report 2009-011. LEI Wageningen UR, The Hague.

TARIC (various years). Integrated Community Tariff Database. Electronic Database, Taxation and Custom Union, European Commission, European Union.

Tonini, A. and R. Jongeneel (2009). The distribution of dairy farm size in Poland: a Markov approach based on information theory, Applied Economics 41 (1): 55-69.

Weiss, C.R. (1999). Farm Growth and Survival: Econometric Evidence for Individual Farms in Upper Austria, American Journal of Agricultural Economics 81: 103-116.

Witzke, H.P. and A. Tonini (2008). Dairy reform scenario's with CAPSIM acknowledging quota rent uncertainty. Paper presented at the XIIth Congress of the European Association of Agricultural Economists (EAAE), 26-29 August, Ghent, Belgium.

WTO (various years). Notifications on export subsidy commitments of the European Communities. Committee on Agriculture, World Trade Organisation, Geneva.

Vavra, P. and B. K. Goodwin (2005). Analysis of Price Transmission Along the Food Chain. OECD Food Agriculture and Fisheries Working Papers No. 3, Organisation for Economic Cooperation and Development, Paris.

Zimmermann, A. and T. Heckelei (2010). Structural change of European dairy farms – a cross regional analysis. Paper presented at the 114th Seminar of the European Association of Agricultural Economists (EAAE), 15-16 April, Berlin, Germany.

Zimmermann, A., T. Heckelei, and I. Pérez Domínguez (2009). Modelling farm structural change for integrated ex-ante assessment: review of methods and determinants. Environmental Science & Policy 12 (5): 601-618.

USDA (2010). Dairy World markets and trade. USDA Foreign Agricultural Service, December.

USDA (2007). Dairy World markets and trade. USDA Foreign Agricultural Service, December.