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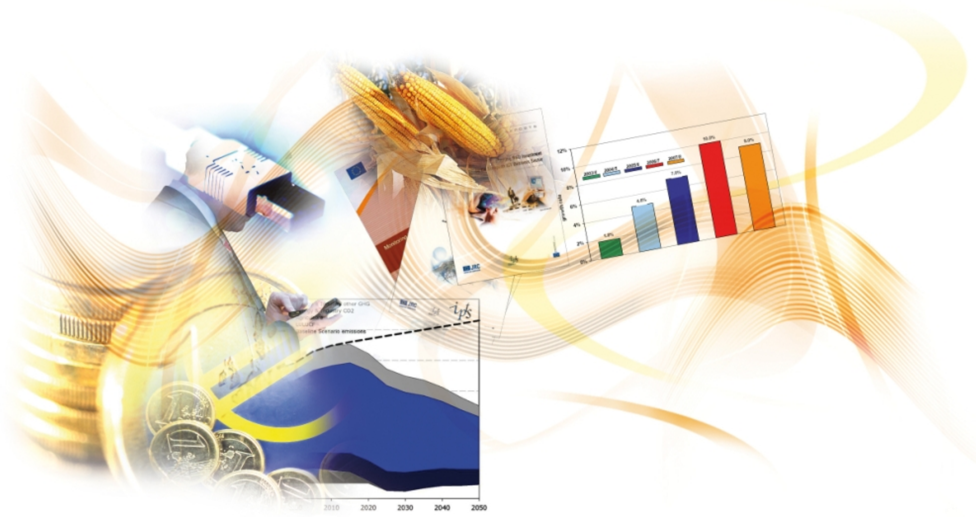

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The Common Agricultural Policy SIMulation (CAPSIM) Model: Dairy Reform and Western Balkan Countries Accession Scenarios

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Executive Summary

This technical report describes the Common Agricultural Policy SIMulation (CAPSIM) model used for analysing the recent dairy policy reform as a result of the so-called Common Agricultural Policy (CAP) 'Health Check' (HC) as well as the potential accession of Western Balkan countries to the European Union (EU). CAPSIM was originally developed by the European Centre for Agricultural, Regional and Environmental Policy Research (EuroCARE) and the University of Bonn on behalf of Directorate General Eurostat (DG ESTAT). In 2006, the CAPSIM model was transferred from DG ESTAT to the European Commission's Joint Research Centre, Institute for Prospective Technological Studies (JRC-IPTS) in order to further develop the modelling tools for CAP analysis and extend the model to new CC. The aim of this study is to provide and describe a multicommodity analysis for agricultural products. Particular attention is given to detailed country level impacts relying on a detailed representation of policies and an enhanced price transmission mechanism. Inter linkages between different agricultural sectors are also considered.

The proposal of the European Commission to implement gradual transitional measures for a 'soft landing' of the milk sector to the expiry of the quota system required in-depth quantitative analyses to be able to assess the impact on commodity markets. At the same time several countries in Europe are EU candidates and it is unclear at the moment how these countries will catch up with the EU market. A major aspect is to what extent new acceding countries will be able to converge to EU prices and adapt their agricultural product mix to this new situation.

Key characteristics of CAPSIM can be summarised as follows (and are described in more detail in Witzke and Zintl, 2007). It is a partial equilibrium model focusing on the agricultural sector with exogenous inputs of macroeconomic variables. It is comparative static and it relies on calibration techniques and a rigorous microeconomic framework for behavioural functions rather than on a full econometric estimation. Major policy instruments include various premiums for activities with associated ceilings, set-aside, intervention prices, quotas, and border measures (tariffs, flexible levies/export refunds, World Trade Organisation (WTO) limits). The main simulation outputs of CAPSIM are market balances, agricultural production and income, changes in processing industry income, consumer welfare and European Agricultural Guarantee and Guidance Fund (EAGGF) impacts. In total the revised product list of CAPSIM includes 21 agricultural outputs, 5 inputs and 11 processed products. The largest part of the database is filled from various DG ESTAT domains.

The CAPSIM model consists of two modes: a reference run mode and a scenario mode for a set of policy scenarios (i.e. on the dairy policy reform and Western Balkan accession). In the reference run or 'baseline scenario' the 2003 Common Agricultural Policy (CAP) Reform is projected into the future (2014 and 2020) giving a yardstick for quota expiry scenarios. The CAPSIM baseline includes recent CAP reforms, price developments in line with forecasts from the Food and Agricultural Policy Research Institute (FAPRI) and some forecasts on policy driven variables such as set-aside aligned with those of Directorate General Agriculture and Rural Development (DG AGRI). A characteristic of CAPSIM is that the baseline is set up as a simultaneous estimation and projection effort permitting to integrate various expert projections subject to the model equations and to estimate those shifts of behavioural functions

providing the closest fit to these projections. The report discusses the baseline price and quantity changes for the most important crop and animal products. Income changes follow basically from combining both and adding the changes on the input side.

In order to perform the analysis on the EU dairy sector, CAPSIM has been extended in its dairy product list that now comprises the following products: butter, skimmed milk powder, cheese, fresh milk products, cream, concentrated milk, whole milk powder, whey powder, casein. All dairy products are linked to each other and to the supply of raw milk through balances on milk fat and protein.

The following dairy reform scenarios have been performed: i) quota expiry scenario: the year 2020, 5 years after the scheduled expiry in 2015, corresponds to the magnitude of medium run elasticities and it is comparable with the long run European Dairy Industry Model (EDIM) 2008 results given for 2020 as well; ii) soft landing policy scenario as part of the Commission's quota expiry strategy involving a series of quota expansion steps. The situation after the last of these steps is simulated and can be compared with the reference run results given for the same year; iii) early quota expiry scenario in 2009: to identify the impact of 'soft landing' relative to an early quota expiry, a quota expiry is also simulated for 2014. This would follow from a hypothetical expiry some years earlier (e.g. in 2009). Key results of the main quota expiry scenario for 2020 are that milk production would increase by 3.1% in the EU-27 whereas milk prices would drop by 7.3%. These impacts would differ by Member State (MS) and tend to be stronger where the initial quota rents were estimated to be higher. In fact it turned out that the regional pattern simulated is strongly influenced by the specification of initial quota rents which reflect differences in marginal costs and thus behavioural functions on the supply side. Market impacts for derived dairy products are usually an increase in supply associated with declining prices, increased demand, and net exports increasing relative to the reference run. The impacts would partly depend on whether market management based on variable export refunds would dampen the price drop or not. In the standard case this market management is still relevant for butter which would limit the price change to 0.6%. Declining prices evidently benefit final consumers at the expense of producers. Sensitivity analyses on different quota rent assumptions and on the abolition of export subsidies are also provided.

To analyse the accession of Western Balkan countries, the price transmission mechanism between MSs prices and EU prices has been enhanced as compared to the previous CAPSIM version as described in Witzke and Zintl (2007). The revised price transmission mechanism is particularly relevant for accession scenarios reflecting differences in composition and in quality of the products considered.

The following Western Balkan accession scenarios have been performed: i) Accession of Croatia in 2010 and the remaining Western Balkan countries five years later; ii) Same as i) but with steering price convergence parameters adjusted in order to allow stronger price convergence; iii) Same as i) but with prior expiry of milk quotas. Accession effects in the Western Balkan countries result in convergence to EU prices, in technology transfer increasing yields. In addition CAP components are introduced on the Western Balkan like milk quotas or decoupled payments. In the animal sector prices are usually higher than in the EU, apart from sheep and goat meat, such that animal production is likely to experience increased competition with the EU-27. In the crop sector there are some products with fairly low prices in some Western Balkan countries (e.g. potatoes and vegetables in Serbia) such that these sectors offer some opportunity for Western Balkan producers to compete on EU markets. Agricultural income per head is projected to increase by about 30% in the Western Balkans with the major contribution coming from the total income change which is supported by an accelerated intersectoral reallocation of labour after accession: the effect on labour estimated to be about 5%. Welfare effects were also estimated to be positive even though quite heterogeneous. There would be a total welfare gain to the region of 1.3 b € which materialises to a large extent in Serbia (+0.7 b €). These favourable impacts are likely to improve further if accession impacts on services and industry had been included in the analysis and if rural development measures had been covered. The degree of price adjustment, highly uncertain and crucial, is checked through sensitivity analyses.

The report consists of six chapters. Chapter 1 introduces and motivates the study. Chapter 2 focuses on explaining the model focusing on its structure, empirical specification, database. Chapter 3 defines the reference run and describe its results. Chapter 4 define and describe the EU dairy reform scenarios whereas Chapter 5 define and describe the EU accession scenarios. Chapter 6 presents the conclusions.

The report is particularly addressed to readers interested on the recent EU dairy reform and further EU enlargement, and to potential CAPSIM users who would like to understand the basic working of the model. The CAPSIM16[1] code written in the General Algebraic Modelling System (GAMS) software is made available together with this JRC Scientific and Technical Report (available under http://www.jrc.es/publications/index.cfm).

[1] CAPSIM16 is the program code in its version from 2008 released for the study carried out by EuroCARE for the Institute for Prospective Technological Studies (IPTS).

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List of main abbreviations

AGricultural MEmber state MODeling: AGMEMOD

Bulgaria and Romania: EU-02

Candidate Countries: CC

Common Agricultural Policy: CAP

Common Agricultural Policy Regionalised Impact: CAPRI

Common Agricultural Policy SIMulation: CAPSIM

Cost, Insurance and freight price: CIF price

Directorate General Eurostat: DG ESTAT

Directorate General for Agriculture and Rural Development: DG AGRI

Economic Accounts on Agriculture: EAA

European Agricultural Guidance and Guarantee Fund: EAGGF

European Centre for Agricultural, Regional and Environmental Policy Research: EuroCARE

European Commission: EC

European Dairy Industry Model: EDIM

European Union: EU

Food and Agriculture Organization of the United Nations: FAO

Food and Agriculture Policy Research Institute: FAPRI

Free On Board price: FOB Price

Generalized Leontief: GL

Global Trade Analysis Project: GTAP

Health Check: HC

International Labour Organization: ILO

Joint Research Centre, Institute for Prospective Technological Studies: JRC-IPTS

Linear Expenditure System: LES

Member States: MS

New Member States: NMS

Rest Of the World: ROW

Single Area Payment Scheme: SAPS

Single Farm Payment: SFP

Tariff Rate Quotas: TRQs

United Nations: UN

World Trade Organisation: WTO

1 Introduction

Agricultural sector models are used to analyse the impacts of policy changes. Recently there has been a growing need for modelling tools able to analyse the Common Agricultural Policy (CAP) developments and the European Union (EU) enlargement. This need forces to frequently update, modify and improve the available modelling tools for agricultural sector analysis.

The European Commission (EC) on November 20, 2008 finalised the so-called 'Health Check' (HC) decisions on the CAP. The HC objective is to ensure that the CAP is meeting its objectives effectively and efficiently in an enlarged EU and in the foreseeable international setting. Milk quotas are one of the policy instruments that have been reassessed. They have become a remnant of an older CAP since the 2003 CAP reform introduced decoupled payments and increased the degree of market orientation in general.

Of importance is also the EU enlargement to countries in South East Europe. At the moment there are three Candidate Countries (CC), Croatia, Turkey and the former Yugoslav Republic of Macedonia. Accession negotiations with the first two started on 3 October 2005 whereas former Yugoslav Republic of Macedonia became a candidate country in December 2005 and accession negotiations have not yet started. The other Western Balkan countries, Albania, Bosnia and Herzegovina, Montenegro, Serbia, and Kosovo under United Nations (UN) Security Council regulation 1244 are under the status of potential CC under the UN Security Council Resolution 1244. Up to now the quality and availability of quantitative information constitute some of the most important limitations for modelling the accession of Western Balkan countries and Turkey.

The aim of the study is to provide and describe a multicommodity analysis for agricultural products able to focus and investigate two EU relevant agricultural policy aspects: the dairy reform and the enlargement to Western Balkan countries. Particular attention is given to detailed country level impacts relying on a detailed representation of policies and an enhanced price transmission mechanism. Inter linkages between different agricultural sectors are also considered.

The analysis is carried out using the Common Agricultural Policy SIMulation (CAPSIM) model originally developed by the European Centre for Agricultural, Regional and Environmental Policy Research (EuroCARE) and the University of Bonn on behalf of Directorate General Eurostat (DG ESTAT). In 2006, the CAPSIM model was transferred from DG ESTAT to the EC's Joint Research Centre, Institute for Prospective Technological Studies (JRC-IPTS) in order to further develop the modelling tools for CAP analysis and extend the model to new CC. CAPSIM provides robust and quick impact analyses for the CAP. Scenario analyses consider a disaggregated coverage of items (21 agricultural outputs, 5 inputs (imported energy rich feed (mainly manioc), protein rich feed (mainly corn gluten fodder), a primary factor aggregate, labour, intermediate consumption) and 11 processed products) and individual EU Member States (MS) and CC. The overall methodology is based on a calibrated, comparative static, partial equilibrium model. Several improvements of the CAPSIM 2009 over the 2005 version, relevant in this report, were: further disaggregation of dairy commodities and upgrade in the price convergence mechanism.

The report consists of six chapters. Chapter 1 introduces and motivates the study. Chapter 2 focuses on explaining the model focusing on its structure, empirical specification, database. Chapter 3 defines the reference run and describe its results. Chapter 4 define and describe the EU dairy reform scenarios whereas Chapter 5 define and describe the EU accession scenarios. Chapter 6 presents the conclusions.

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2 THE COMMON AGRICULTURAL POLICY SIMULATION (CAPSIM) MODEL

2.1 MODEL STRUCTURE

Key characteristics of CAPSIM can be summarised as follows (and are described in more detail in Witzke and Zintl, 2007). It is a partial equilibrium model relying on exogenous inputs of macroeconomic variables. It is comparative static, but may be used for any sequence of projection years provided that exogenous variables have been forecasted for these years and parameters are adjusted according to the length of the run. In terms of empirical specification, it relies on calibration techniques and a rigorous microeconomic framework for behavioural functions rather than on a full econometric estimation. Several hard technological relationships have been incorporated to support the microeconomic framework. Examples are balances of male and female calves, land, feed energy and protein, milk fat and protein. For these constraints, it is useful that CAPSIM covers the complete agricultural sector (as described in DG ESTAT's Economic Accounts on Agriculture (EAA) and market balances). It is a deterministic model trying to capture the mean result from a set of exogenous variables, so far starting from a three-year average base year to eliminate, as far as possible, the influence of yield fluctuations and short-run price fluctuations. Market clearing differs depending on the products. For many products it explicitly distinguishes gross imports and exports, while for others it only solves for net trade and for a number of items net trade may also be basically fixed[3]. Within the EU, a pooled (non-spatial) market is assumed and bilateral trade flows are not modelled. However, national prices are flexibly linked to the EU level. Exogenous variables are: policy parameters, non-agricultural prices (also applied to non feed inputs of agriculture), total final consumer expenditure, land supply, border prices for some products (e.g. oilseeds), and external forecasts (reference run mode) or shifters (simulation mode). Endogenous variables are: agricultural activity levels, market balances, market prices, income, European Agricultural Guidance and Guarantee Fund (EAGGF) expenditure, shifters of behavioural functions (in reference run mode), labour is estimated based on ad hoc functions of other variables in CAPSIM and in that sense labour is endogenous. However, this is a pure pragmatic forecasting device without any feed back into the model. The following agents may be distinguished in the model: agricultural producers are profit maximisers with a pragmatic acknowledgement of different behavioural models underlying subsistence production and agricultural labour use; the processing industry (oilseeds, dairy) also follows profit maximisation; the food industry and compound feed industry apply a fixed margin between producer and consumer prices; land supply is exogenous; for labour and capital it is assumed that 50% are perfectly variable with the factor price approximated by the general price index. The other 50% are assumed fixed and receive agricultural profit as residual income; final consumers maximise utility; policy is exogenous but export subsidies and import levies are linked to the difference of administrative and market prices; export demand (import supply) from Rest Of the World (ROW) is described by an ad hoc behavioural function dependent on a single variable, the EU export price. Major policy instruments include various premiums for activities with associated ceilings, set-aside, intervention prices,

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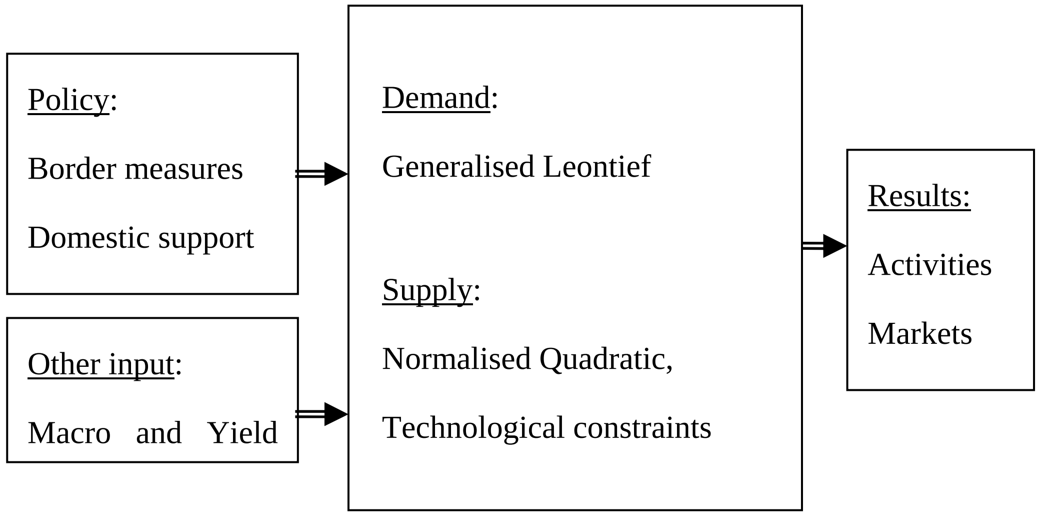
[3] Gross EU extra trade data from the Food and Agriculture Organization (FAO) have been incorporated and merged with DG ESTAT based market balances for cereals, rice, vegetables, fruits, potatoes, sugar, meats, eggs, milk products, olive oil and wine. Net trade modelling with given border prices is currently applied in case of 'Oilseeds' and corresponding cakes and oils whereas for nontradables such as calves and fodder items, net trade is nearly fixed by the intra EU price transmission specification.

quotas, and border measures (tariffs, flexible levies/export refunds, World Trade Organisation (WTO) limits). The main simulation outputs of CAPSIM are market balances, agricultural production and income, changes in processing industry income, consumer welfare and EAGGF impacts, which give a conventional measure of welfare change.

In a nutshell the structure looks like a textbook example of a partial equilibrium model as given by Figure 1. Apart from a number of details to be explained below, Figure 1 correctly represents the essence of CAPSIM, albeit only in the standard, policy simulation mode. Figure 1 neglects the facts that behavioural functions are in CAPSIM for activity levels rather than directly for supply and that net revenues rather than prices are determinants of these. In this mode all parameters are given and exogenous inputs, for example yields, final consumption expenditure, and the inflation rate, are usually taken over from the reference run. The reference run mode is used to calibrate the unknown time-dependent parameters (shifters) in model equations, building on exogenous forecasts and ex-post observations for the related variables (i.e. the activity levels). For this calibration of time-dependent parameters, the functional forms of the behavioural functions are chosen so that neither symmetry, homogeneity nor curvature are affected by these shifters, provided the other parameters linked to price responsiveness are held constant.

Figure 1: Nutshell representation of CAPSIM as a partial equilibrium model



In the policy simulation mode the parameters are fixed of course and if policy inputs and other inputs are chosen with their reference run values in the policy simulation mode, the outcome reproduces exactly the reference run results. Up to that point, we will focus on the standard, policy simulation mode, i.e. applications with given parameters.

As already indicated CAPSIM, is a comparative static model. No equation involves lags or leads. Prices are assumed to be perfectly forecasted or are learnt during the adjustment to a new equilibrium. Adjustment costs in agriculture[4] are ignored and there is no partial adjustment mechanism applied at the moment. Nonetheless CAPSIM may be applied to a

[4] However, the time dependent price convergence term in the price linkage equation indirectly reflects adjustment costs in the marketing system which has to adjust in the New Member States (NMS) and CC. However, the marketing chain is not represented explicitly in CAPSIM due to the fixed margin assumption.

sequence of years but each simulation result will be independent from the result of the previous period. This is questionable if a full time series of projections is produced because for yearly changes short-run frictions will have an impact. Typical econometric models such as those from the AGricultural MEmber state MODeling (AGMEMOD) group therefore include in their equations, say for harvested area or yields, the lagged endogenous variable (lagged area or yield) among the explanatory variables (AGMEMOD Partnership, 2007). In simulations such equations imply a sluggish adjustment to a new equilibrium after a change in exogenous drivers. A comparative model on the other hand would immediately jump to the new equilibrium which is implausible for short-run projections. Comparative static projections have a more convincing interpretation for larger steps, for example a 12 year projection with two intermediate points, in particular if the set of exogenous variable is expected to change. This proposition rests on the relative strength of dynamic effects (neglected in CAPSIM) and comparative static effects (captured in CAPSIM) between two simulation years: after a few years (say 4-5 years) adjustment to a new equilibrium will be nearly complete, such that the bias due to neglecting dynamic impacts from earlier years will be small. This holds at least compared to a modelling attempt for yearly changes; dynamics from autoregressive expectations will have stabilised as well. Furthermore many policy measures are phased in according to an agreed time schedule such that lags deriving from autoregressive expectations will not matter at all; on the contrary important comparative static drivers (covered in CAPSIM) will tend to dominate in a medium run horizon: after some years, yields will have grown, world prices will be different and new policies may have been phased in.

2.2 EMPIRICAL SPECIFICATION

2.2.1 Producer supply and food demand

The behavioural functions for producers are derived from a Normalised Quadratic profit function (Lau, 1978) in terms of net revenues and net prices (see Witzke and Zintl, 2007 for details of this approach to include physical balances):

$$\pi_{m,t}(\mathbf{N}_{m,t}) = \alpha_{m,0,0,t} + \Sigma_j \alpha_{m,j,0,t} N_{m,j,t} + \Sigma_j \Sigma_k \alpha_{m,j,k} N_{m,j,t} N_{m,k,t} \tag{1}$$

where

$$\mathbf{N}_{m,t} = (\mathbf{NREV}_{m,t}, \mathbf{NP}_{m,t})' / PP_{m,REST,t} \tag{2}$$

and

$\pi_{m,t}$ = normalised profit function in MS m, year t

$\mathbf{N}_{m,t}$ = column vector of price variables normalised by the general price index $PP_{m,REST}$ in MS m, year t

$\mathbf{NREV}_{m,t}$ = column vector of net revenues $NREV_{m,j}$ for activity j, MS m, year t

$\mathbf{NP}_{m,t}$ = column vector of net prices $NP_{m,i}$ of input i in MS m, year t

$\alpha_{m,j,k}$ = time invariant parameters of the profit function in MS m

$\alpha_{m,j,0,t}$ = time dependent parameters of the profit function in MS m

This gives behavioural functions of netputs $Y_{m,j,t}$ linear in $\mathbf{N}_{m,t}$. Treating the price responsiveness parameters $\alpha_{m,j,k}$ as time invariant permits to shift behavioural functions without affecting curvature. This simplification corresponds to usual practice in econometrics where price responsiveness parameters are often considered stable as well. Of course this is a simplification which would need empirical testing, ideally.

The specification for food demand will follow from a Generalized Leontief (GL) type indirect utility form. Ryan and Wales (1996) have shown that theoretically consistent demand systems with linear Engel curves will stem from an indirect utility function of the following form:

$$V_m(\mathbf{CP}_m, EX_m^{HD}) = -G_m / (EX_m^{HD} - F_m) \tag{3}$$

where

$\mathbf{CP}_m$ = consumer prices $\mathbf{CP}_m$ in Member State m

EX_m^{HD} = consumer expenditure per head (HD) in Member State m

G_m, F_m = linear homogenous functions of consumer prices $\mathbf{CP}_m$ in Member State m

V_m = indirect utility function in Member State m

Roy's identity gives demand functions of the form:

$$CNS_{m,i}^{HD} = -\frac{\partial V_m}{\partial CP_{m,i}} \bigg/ \frac{\partial V_m}{\partial EX_m^{HD}} = \frac{G_{m,i}}{G_m} \times \left(EX_m^{HD} - F_m\right) + F_{m,i} \tag{4}$$

where

$CNS_{m,i}^{HD}$ = per capita demand quantity of item i in Member State m

$G_{m,i}$ = $\partial G_m / \partial CP_{m,i}$

$F_{m,i}$ = $\partial F_m / \partial CP_{m,i}$

where $F_{m,i} = \delta_{m,i,t}$ (time dependent parameter for item i) and function F_m is linear in prices:

$$F_m(\mathbf{CP}_m) = \sum_u \delta_{m,u,t} CP_{m,u} \tag{5}$$

Function G_m is of GL form:

$$G_m(\mathbf{CP}_m) = \sum_u \sum_v \beta_{m,u,v} CP_{m,u}^{\ \ 0.5} CP_{m,v}^{\ \ 0.5} \tag{6}$$

and $G_{m,i}$ is its derivative with respect to price i:

$$G_{m,i}(\mathbf{CP}_m) = CP_{m,i}^{\ \ -0.5} \sum_u \beta_{m,u,i} CP_{m,u}^{\ \ 0.5} \tag{7}$$

where $\beta_{m,u,i}$ are time invariant price response parameters of the demand system related to items u and i.

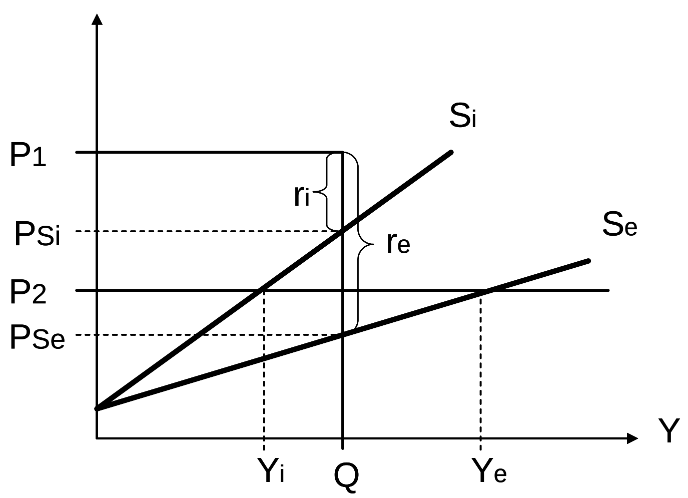
Note the similarity to the well known Linear Expenditure System (LES), the only difference being that the marginal budget shares of the GL system are functions of all prices. As in the LES function, F_m may be interpreted as the value of committed income, given exogenous (committed) consumption quantities $\delta_{m,i,t}$. The expression in brackets in Equation (4) corresponds to uncommitted income which is allocated according to the marginal budget shares.

2.2.2 Milk quotas and the behaviour of dairies

The dairy sector differs from other parts of animal production in two respects, the milk quota regime and a complex processing sector which is explicitly represented in CAPSIM including milk fat and protein balances.

The dairy quota has been implemented so far in CAPSIM simply as fixed supply quantity which generates a shadow price, in line with many other empirical analyses. In graphical form this may be represented as in Figure 2 depicting the situation in two MS with different marginal cost or supply curves: S_i and S_e. The producer price P, another determinant of the quota rent, is assumed equal in the two countries for ease of exposition.

Figure 2: Supply functions and quota rents of two producers under a quota regime



A relatively efficient MS 'e', for example The Netherlands, has lower marginal cost and hence a higher unit quota rent r_e compared with a less efficient MS 'i', for example Portugal. In a quota abolition scenario it is likely that EU prices would decrease ($P_2 < P_1$), be it as a consequence of market response to an aggregate increase of EU supply of raw milk or as a result of accompanying market management on the part of the EU. It is likely therefore that production of more efficient producers (Y_e) would increase from the equilibrium quantity (Q) whereas production in less efficient MS (Y_i) would decline from the equilibrium quantity (Q). It is visible from the figure that production will increase (decrease) if the price cut is smaller (larger) than the initial quota rent. The magnitude of effects then also depends on elasticities, related to the slopes in the figure.

Many studies of the EU milk market and quota abolishment or increases have been undertaken in the past. Table 1 shows that the size of the expected increase of EU production is closely linked to the assumption on initial quota rents, given in percent of producer prices in column 'Rent/Price'.

Table 1: Impacts of quota removal (or increases) on EU raw milk prices and production

Study	Years	Rent/Price	Scenario	d(Price)	d(Quantity)
Lips, Rieder 2005	1997	~ 20%	Quota + export subsidy abolition vs. Pre Agenda 2000	-22%	3%
Langley, Somwaru, Normile 2006	2000	20%	Quota abolition (EU+ Can) vs. Pre Agenda 2000	-9%	4%
INRA-Wageningen Consortium 2002	2000-14	~40%	Quota abolition vs. Agenda 2000	-34%	11%
EDIM 2005b	2003-14	~40%	Quota +14% vs. MTR+WTO agreement	-19%	6%
FAPRI-Ireland Partnership 2007	2004-15	~ 20%	Quota +20% vs. MTR	-7%	4%

The analysis by the INRA-Wageningen Consortium (2002) stands out with the highest impacts for two reasons. First of all the quota rents used in the analysis were relatively large and second, the reinforced price cuts of the Luxembourg reforms (Mid Term Review package) were not yet built into the analysis. These price cuts were incorporated in the successor study with EDIM (EDIM, 2005a and b) which also includes a refined trade modelling and the EU Enlargement. The most recent study by the Food and Agriculture Policy Research Institute (FAPRI) Ireland Partnership gave still lower price and quantity impacts which is mainly due to the lower quota rents assumed. This is confirmed by a sensitivity analysis on quota rents in EDIM (2005b). Lips and Rieder (2005) also report higher price impacts but it should be recognized that this analysis also included an abolition of export subsidies and built on the high pre Agenda 2000 prices in the database. These trade liberalization impacts are just as contentious as the size of the initial quota rents. According to other results from EDIM (2005b) the impacts are quite small, as the intervention price cuts and ceilings imposed on subsidized exports render the protection quite ineffective whereas a WTO agreement would also open foreign markets to the EU. Other analyses using the Global Trade Analysis Project (GTAP) model and lower quota rents (Lips and Rieder, 2005, FAL/Bfel, 2006) have reported strong impacts from the abolishment of export subsidies which would even render the milk quota completely ineffective (FAL/Bfel, 2006, p. 32). These results might be specific to the handling of subsidized export (ceilings) in GTAP but it is noteworthy that the lowest impacts reported for quota abolition are zero. A non-binding milk quota after WTO driven price cuts of about 20% has also been found by the Federal Agricultural Research Centre (FAL) researchers in Germany with programming models applied to Germany alone.

All results, including reallocations of production and animals among MS, will crucially depend on the assumed quota rents (and supply elasticities). For the rents the following table presents rents from INRA Wageningen Consortium (2002), Lips and Rieder (2005), more recent European Dairy Industry Model (EDIM) estimates (EDIM, 2005b, additional working papers on http://edim.vitamib.com/, column 'EDIM05'), from Common Agricultural Policy

Regionalised Impact (CAPRI) (directly read from the database in the so called trunk version[5]) and the most recent quota rents used in EDIM (see Réquillart et al., 2008, column 'EDIM08') which provide the default assumptions for CAPSIM as well. In addition the following table gives an alternative set with high quota rents for a sensitivity analysis to illustrate the uncertainty regarding a key driver for the results:

Table 2: Quota rents expressed as percentage of milk prices

	INRA-Wageningen	Lips-Rieder	EDIM05	CAPRI	CAPSIM = EDIM08	CAPSIM-high
Portugal	27	0	21	20	14	25
UK	43	27	27	42	0	0
Italy	37	23	32	20	28	43
Sweden	15	10	33	6	0	0
Denmark	42	26	33	20	15	26
Greece	37	0	34	13	9	16
France	35	22	37	37	19	34
Ireland	49	31	37	25	28	43
Austria	46	17	38	50	31	46
Finland	24	15	41	5	7	12
Spain	38	24	41	20	42	57
Netherlands	36	23	44	53	48	63
Germany	45	20	45	20	10	18
Belgium	32	20	47	46	30	45

Column 'EDIM08' has been calculated from milk prices and marginal costs in EDIM for the starting point of the recent EDIM simulations (year 2008) which has been compiled to reflect the current situation while removing short run impacts such as the quota over-run in a given year. It is, thus, a more suitable starting point for a comparative static model like CAPSIM than, for example, the historical marginal costs and quota rents in 2005. Overall the updated EDIM quota rents are plausible. The quota rents in Germany are certainly low compared to the earlier estimates and considering that quota overrun has been the typical situation in Germany in the last years. But using the same starting point in CAPSIM as in the EDIM08 study will also facilitate the analysis and comparison of results. In practice there are many other differences between CAPSIM and EDIM (functional forms, sector wide coverage, aggregation of 'Cheese' types etc.). However a crucial determinant of simulation results is certainly the set of marginal costs or quota rents used. Therefore we will provide a sensitivity analysis relying on high quota rents in addition to the default version in order to disentangle the impact on final results of different assumptions on quota rents. High quota rents have been calculated as 'CAPSIM-high' = Edim2008 + min(0.75×Edim2008, 0.15), thus implying a strong upward variation with a cut off limit at 15 percentage points to prevent implausible results in countries with high quota rents such as The Netherlands and Spain.

For an application of CAPSIM to a future horizon we also have to develop hypotheses on the change in marginal cost (or rents) over time. Again a valuable source of information is the collection of working papers on the EDIM website where Cathagne, Guyomard, Levert (2006) give information on changes of marginal costs over time. This suggests on average a small decrease of about 0.5% per year which corresponds well with the assumed increase of feed efficiency in the (whole) livestock sector of 0.4% in the CAPSIM reference run. Note that feed is not explicitly represented in EDIM but that this is the most important cost component.

A number of issues have been ignored in the description of the dairy sector according to Figure 2 but should be acknowledged as limitations (of any aggregate analysis). Regarding

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[5] The so-called 'trunk-version' of the CAPRI system is the standard version which may differ from special versions of the system such as the 'milk version' currently under development for an analysis of regional impacts of milk reform scenarios.

the length of run or the amount of fixed factors, it is consistent with a medium run horizon to assume that land is essentially fixed which basically holds in the EU if cross-compliance basically requires maintaining the use of permanent grassland. On the other hand grassland may also be used for sheep production such that at least for dairy farming, land need not be considered fixed. With variable land EDIM researchers have obtained lower quota rents because the cost of land needs to be accounted for, but reliable prices for land are difficult to obtain. The issue about the appropriate assumption for asset fixity and sunk cost is even more complex when thinking of different regimes at the farm level. Some farms may produce on the decreasing marginal cost section of their supply curves, others may be in the standard regime. All may also differ in terms of the sunk cost at a given year. Aggregate modelling is thus bound to suffer from aggregation problems.

The kinked supply curves are only appropriate in case of full tradability or particular lucky administrative distribution. They assume an efficient distribution of quota rights. Otherwise behavioural functions would not simply have a kink as shown but would rotate upwards to some extent, indicating the additional production costs because milk is not produced in a cost minimizing fashion in the sector. This problem seems to be concentrated on France whereas several other countries have introduced some platform for rather free trade of quota rights within the Member State[6].

It has been mentioned that the CAPSIM database has been disaggregated and extended to include additional dairy products. The current dairy products treated in CAPSIM are: 'Butter', 'Skimmed milk powder', 'Cheese', fresh milk products, cream, concentrated milk, 'Whole milk powder', whey powder, casein. They are linked to each other and to the supply of raw milk through balances on milk fat and protein:

$$\sum_{s \in SEMLK} \gamma_{m,s,c} PRD_{m,s,t} = \sum_{r \in RAWMLK} \gamma_{m,r,c} PRC_{m,r,t} \tag{8}$$

where

$PRD_{m,s,t}$ = production in MS m of secondary milk product s, year t

$\gamma_{m,s,c}$ = content in MS m of secondary product s in terms of c $\in$ {milk fat, milk protein}

$PRC_{m,r,t}$ = processing in MS m of raw milk type r $\in$ {cow milk, sheep milk}, year t

$\gamma_{m,r,c}$ = content in MS m of raw milk type r in terms of c $\in$ {milk fat, milk protein}

Similar balances are included in many large scale partial agricultural simulation models whereas CGE models usually do not allow for this level of technical detail. What partly differs among the models are the equations steering supply of dairy products and demand for raw milk which look in CAPSIM as follows:

6 With perfect foresight and certainty, the distinction between selling and leasing markets would be irrelevant. In practice the prices of these two market channels are not fully comparable. In applied modelling systems such as CAPRI, both are used, depending on data availability, for pragmatic reasons.

$$PRX_{m,i,t} = \theta_{m,i,0} + \sum_j \theta_{m,i,j} \quad PM_{m,i,t} / PP_{m,rest,t} \tag{9}$$

where

$PRX_{m,i,t}$ = $PRC_{m,i,t}$ (X=C => i∈RAWMLK, demand) or $PRD_{m,i,t}$ (X=D => i∈SECMLK, supply)

$\theta_{m,i,j}$ = parameters of behavioural functions in MS m

$PM_{m,i,t}$ = net margin in MS m in processing of raw milk type i or production of secondary i (normalised with the general price index)

and

$$PM_{m,i,t} = PP_{m,i,t} - \sum_c \gamma_{m,i,c} PS_{m,c,t} \tag{10}$$

where

$PP_{m,i,t}$ = producer price in MS m of (milk) product i, year t

$PS_{m,c,t}$ = shadow price in MS m of content c, year t

Note that for dairy products Equation (9) is a supply function which should respond positively to an increase in the margin whereas for raw milk Equation (9) is a derived demand. Both may be obtained from a normalised quadratic profit function (compare Equation 112 from the CAPRI documentation Britz, 2005).

The common ground between CAPRI, AGMEMOD and CAPSIM is formed by the assumption that production may shift between milk products (in the feasible space defined by balances on milk fat and protein), but subject to increasing marginal costs for the expansion of specific products. This tends to limit the responsiveness of the dairy sector. In CAPSIM the assumption of constant processing costs per unit for each dairy product, as in an early version of EDIM or Grams (2004), is relaxed. In early applications (see EDIM, 2005a or Grams, 2004), the optimal mix of dairy products at given prices for secondary products as well as a given raw milk price (or quantity) is a linear programme. It is likely that solutions would be rather unstable if prices were exogenously passed on to the processing sector alone. In practice the solution is stabilised by the final demand specification, rendering prices endogenous. With constant marginal costs the dairy industry would operate in an indeterminate optimum, ready to switch to another product composition in response to final demand changes. In the meantime EDIM has been extended to include increasing marginal cost in the dairy industry, but without any other interdependencies among products than the milk fat and protein balances. In principle the CAPSIM approach permits to reflect specific supply side relationships among particular products such as a complementarity between whey powder and casein / 'Cheese' and between 'Butter' and skimmed milk in the parameters $\theta_{m,i,j}$, beyond the linkages imposed by fat and protein balances. As whey is always produced jointly with 'Cheese' or casein this complementarity is well founded. 'Butter' and 'Skimmed milk powder' are partly produced jointly in dairies which cannot easily switch to other protein rich outputs (i.e. 'Cheese' or fresh milk products). Other dairies permit a flexible reallocation of protein to other outputs. Lacking statistical information about the shares of different types of plants, it appears reasonable to assume a weak complementarity for 'Butter' and 'Skimmed milk powder' (cross price elasticity of 'Skimmed milk powder' with respect to the 'Butter' price = +0.2), strong complementarity for whey powder and 'Cheese' / casein (cross price elasticity of whey powder with respect to the prices of 'Cheese' or casein = +1.0) and equal substitutability for all other output pairs to initialise the elasticity calibration for the dairy industry.

2.2.3 Market clearing and price transmission

Total demand $DEM_{m,i,t}$ is the sum of input demand $INP_{m,i,t}$, human consumption $CNS_{m,i,t}$, processing demand $PRC_{m,i,t}$, and a few less important demand components: seed and waste are proportionally linked to production ($LNK_{m,i,t}$), industrial demand $IND_{m,i,t}$ is forecasted exogenously, and stock changes $STC_{m,i,t}$ are equally specified exogenously (usually set to zero) during simulations.

The balance of production $PRD_{m,i,t}$ and total (private, i.e. non intervention) demand $DEM_{m,i,t}$ is excess supply. After aggregation to the EU level this equals EU net exports $NET_{i,t}$:

$$NET_{i,t} = \Sigma_m (PRD_{m,i,t} - DEM_{m,i,t}) \qquad (11)$$

Market clearance may occur in various regimes. The simplest solutions are regimes with given border prices (applied in case of oilseeds and corresponding cakes and oils) or with exogenously given net trade (currently only for non-tradables such as calves and fodder items). In these regimes net trade is either a free residual variable or it is fixed.

The net trade specification does not permit handling export and import measures independently and it poses serious difficulties for a modelling of WTO limits. To account for the most important of these, gross EU extra trade data from the Food and Agriculture Organization (FAO) of UN have been incorporated in the CAPSIM database as mentioned above. For the products concerned there are explicit ROW import demand functions $X_{i,t}(PX_{i,t})$ and ROW export supply functions $M_{i,t}(PM_{i,t})$ which are typically constant elasticity functions of the corresponding border prices:

$$NET_{i,t} = X_{i,t}(PX_{i,t}) - M_{i,t}(PM_{i,t}) \qquad (12)$$

Tariff rate quotas (TRQ) are currently not modelled anymore in CAPSIM. This is a gross simplification if TRQs are bilateral and need not improve the quality of simulation results. For AgraCEAS (2005) an aggregate TRQs has been described by a constant term in the ROW export supply function $M_{i,t}(PM_{i,t})$.

The problem is to define an aggregation formula giving an aggregate TRQ as a function of bilateral TRQs and their historical fill rates, which are often defined at least at level 8 of the Harmonised System (HS) classification. A simple rule would be to consider disaggregate TRQs with fill rates close to 100% as binding and to include them in the definition of the aggregate TRQ. However in a scenario with a 50% increase of all TRQs some will not be binding anymore and some formerly irrelevant TRQs with over quota imports may nonetheless trigger additional imports if an increase by 50% causes a change in regime. The conclusion from these ambiguities is to ignore TRQs altogether.

Tariffs and export subsidies link import and export unit values at the EU border to internal prices:

$$PX_{i,t} = PE_{i,t} - ESUT_{i,t} \tag{13}$$

$$PM_{i,t} \times (1 + TARA_{i,t}) = PE_{i,t} - TARS_{i,t} - FLEV_{i,t} \tag{14}$$

$PX_{i,t}$ = EU export unit value of item i, year t

$PE_{i,t}$ = EU market price of item i, year t

$ESUT_{i,t}$ = Export subsidy per ton of item i, year t

$PM_{i,t}$ = EU import unit value of item i, year t

$TARA_{i,t}$ = ad valorem tariff of item i, year t

$TARS_{i,t}$ = specific tariff of item i, year t

$FLEV_{i,t}$ = flexible levy of item i, year t

$ESUT_{i,t}$ is the average subsidy calculated as the ratio of EAGGF export refunds (EU Commission, 2007a) divided by total extra EU exports $X_{i,t}$.

Administered prices $PADM_{i,t}$ are related to flexible levies or export subsidies which are endogenously determined to defend a target price for EU market prices. Note that the target price is not a legal concept. Rather it is a behavioural concept to approximate the collective decision making in market management committees which are likely to anchor their decisions to any existing administrative prices (intervention, basic price etc., depending on CMO), whatever may be their precise role in the CMO[7]. The target price is a certain percentage of the administrative price. This percentage (τ_0 in Equation (15)) is calibrated in line with the base year data and a pre-specified responsiveness parameter (τ_1 in Equation (15), set to $\tau_1 = 100$):

$$ESUT_{i,t} = PADM_{i,t} \times \left\{ 1 \Big/ \left(1 + \exp\left[\tau_1 \left(\frac{PE_{i,t} - \tau_0 PADM_{i,t}}{\tau_0 PADM_{i,t}} \right) \right] \right) \right\} \tag{15}$$

[7] For cheese and whole milk powder a 'target price' has been derived from the contents in terms of milk fat and protein and the administrative prices for butter and skimmed milk powder, similar to the approach chosen in EDIM.

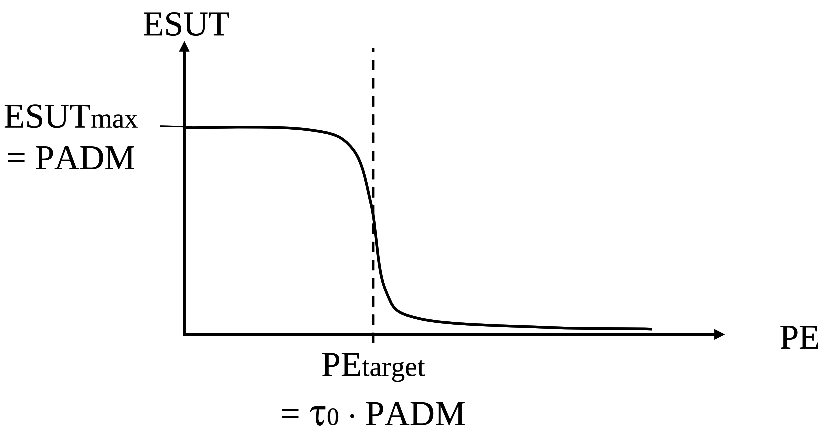
where

τ_0 = target price percentage of administrative price $PADM_{i,t}$

τ_1 = subsidy responsiveness

A similar equation holds for flexible levies. A graphical representation of Equation (15) is given in Figure 3. If market prices are clearly lower than the target level ($\tau_0 \cdot PADM$) EU authorities would try to support market prices as much as possible. The maximum conceivable unit export subsidy would correspond to the full amount of the administrative price such that the good is essentially given away as a gift to other countries. This is a rather irrelevant part of the function because market prices will be more often in the range around the target level or even above (as is currently the case for many products). Close to the inflexion point the unit subsidy quickly drops almost to zero if market prices increase. Zero subsidies will be approached as market prices exceed the target level significantly, depending on parameter τ_1. This parameter also determines the steepness of the logistic function close to the target level: a high value for τ_1 gives a rather steep function, able to approximate a classical intervention (which basically involves subsidised exports after some period of storage). A lower value on the contrary, would be more appropriate for products with more flexible market management, for example 'Cheese' or poultry, where export subsidies respond less clearly to the average price level because they refer to particular segments of the market.

Figure 3: Export subsidies as a function of EU market prices in CAPSIM



Producer price changes in MC are linked to the EU level as follows:

$$PP_{m,i,t} = PE_{i,t} \times \phi_{m,i}(NET_{m,i,t}) \times [1 - \psi_{m,i}(\mathbf{X}_t)] + PE_{i,t} \times \psi_{m,i}(\mathbf{X}_t) \quad (16)$$

where

$PP_{m,i,t}$ = producer price of product i in MS m, year t

$\psi_{m,i}(\mathbf{X}_t)$ = price convergence parameter ($0< \psi \leq 1$) pulling the national price to the EU level depending on variables $\mathbf{X}$ = {time, initial protection, initial price difference}, see Equation (19) below, and

$$\phi_{m,i}(NET_{m,i,t}) = \phi_{m,i,0} \times \left\{ \phi_{m,i,lo} \times \frac{1}{1 + \exp\left[-\phi_{m,i,1} \left(\frac{NET_{m,i,t}}{PRD_{m,i,t} + DEM_{m,i,t}} \right) \right]} + \phi_{m,i,up} \times \left(1 - \frac{1}{1 + \exp\left[-\phi_{m,i,1} \left(\frac{NET_{m,i,t}}{PRD_{m,i,t} + DEM_{m,i,t}} \right) \right]} \right) \right\} \tag{17}$$

where

$\phi_{m,i,0}$ = parameter capturing base year price differences between EU level and MS m, for producer price of product i

$\phi_{m,i,lo}$ = lower bound parameter for MS m, product i

$\phi_{m,i,up}$ = upper bound parameter for MS m, product i

$\phi_{m,i,1}$ = responsiveness of lower bound weight to $NET_{m,i,t}$ in MS m, product i

The conversion factor between MS prices and EU prices ($\phi_{m,i}(NET_{m,i,t})$) reflects differences in composition and in quality of the products involved. As they will also depend on transaction cost of trade (e.g. Cost, Insurance and Freight (CIF) and Free On Board (FOB) price differences) the conversion factor between the EU and MS level varies between a lower bound ($\phi_{m,i,0} \cdot \phi_{m,i,lo}$) and an upper bound ($\phi_{m,i,0} \cdot \phi_{m,i,up}$) according to a weight depending on net trade. Upper and lower bound have been related for tradable products to average CIF - FOB differences according to the same dataset used in the data consolidation routine COCO (see Witzke et al., 2008) subject to the calibration constraint that the outer bracket in Equation (17) evaluates to one in the base year. For calves it would have been implausible to have strongly changing net trade such that the bound parameters have been set far apart ($\phi_{m,i,up} = 1.98$ and $\phi_{m,i,lo} = 0.02$). This gives large price changes already for small changes in net trade such that such changes are penalised. The responsiveness parameter is chosen such that net trade equal to 50% of the sum of supply and demand (i.e. very large net exports) would give a weight of 0.9 for the lower bound. The approach chosen thus disaggregates the full conversion factor into several components each with a particular meaning to permit a transparent and plausible choice of parameters.

However for fodder items and raw milk, Equation (17) would have permitted still non-negligible changes in net trade such that for those a modified version has been used:

$$\phi_{m,i}(NET_{m,i,t}) = \phi_{m,i,0} \times \frac{1}{1 + \exp\left[-\phi_{m,i,1} \left(NET_{m,i,t} - \phi_{m,i,2} \right) \right]} \tag{18}$$

where

$\phi_{m,i,0}$ = maximum ratio of producer price $PP_{m,i,t}$ to EU price $PE_{i,t}$ (if $NET_{m,i,t} \rightarrow \infty$)

$\phi_{m,i,1}$ = responsiveness of sigmoid to $NET_{m,i,t}$ in MS m, product i

$\phi_{m,i,2}$ = reference level for $NET_{m,i,t}$ in MS m, product i (residual in calibration)

Due to its different functional form Equation (18) permits to nearly fix net trade, depending on the choices[8] for $\phi_{m,i,0}$ and $\phi_{m,i,1}$. The old solution in CAPSIM was to have net trade for 'Fodder' and raw milk exactly fixed. With sufficiently high choices of $\phi_{m,i,0}$ and $\phi_{m,i,1}$ this would also be possible with Equation (18). However, in the planned dairy scenarios it was expected that small changes in net trade flows of raw milk within the EU could occur which provides a weak direct link between raw milk prices of different MS in addition to indirect links over dairy markets.

Equation (16) above has also included the price convergence parameter $\psi_{m,i}(\mathbf{X}_t)$. For EU-15 members $\psi_{m,i}(\mathbf{X}_t) = 0$, $\forall t$, but for the New Member States (NMS)[9] and Balkan countries we acknowledge some likely convergence to EU prices by setting $\psi_{m,i}(\mathbf{X}_t) > 0$ as follows.

$$\psi_{m,i}(\mathbf{X}_t) = \psi_1 \times \left(1 - \psi_2^{\,t-ta}\right) + \psi_3 \times \max\left(0, \min\left(1, \frac{TAR_{m,i,tb}}{\left(PP_{m,i,tb} - PE_{i,tb}\right)}\right)\right) \qquad (19)$$

where

$\mathbf{X}_t$ = (t, $TAR_{m,i,tb}$, $PP_{m,i,tb}$ - $PE_{i,tb}$)

ψ_1 = maximum convergence with zero initial protection (= 0.2)

ψ_2 = maximum transaction cost parameter (= 0.6)

ta = accession year

ψ_3 = initial protection parameter (= 0.5)

tb = base year

$TAR_{m,i,tb}$ = Sum of all tariffs in base period tb in MS m, product i

Without initial border protection with $TAR_{m,i,tb} = 0$, $\psi_{m,i,t}$ would decline asymptotically to the lower bound $\psi_1 = 0.2$, reflecting the decline in transaction costs related to better intra EU transport networks. The decline is steered by parameter ψ_2 as a function of time. This transaction cost motivated price convergence may either increase or decrease prices in NMS.

8 The maximum ratio of producer price $PP_{m,i,t}$ to EU price $PE_{i,t}$ ($\phi_{m,i,0}$) has been set to 10 times its base year value, while responsiveness was set to 1000 / (($PRD_{m,i,t}$ + $DEM_{m,i,t}$)).

9 To simplify the discussion of results, the 10 NMS of 2004 will be called 'EU-10 (members)', Bulgaria and Romania will be called 'EU-02 (members)', both forming the group of 'EU-12 (members)', whereas the group of old MS is called as usual 'EU-15 (members)'.

Conversely the second component of price convergence, due to a dismantling of border protection, can only decrease prices in NMS. If there was border protection initially ($TAR_{m,i,tb} > 0$) and a positive base period price difference ($PP_{m,i,tb} - PE_{i,tb} > 0$) the total price convergence $\psi_{m,i}(\mathbf{X}_t)$ is increased, because it is assumed that prices would move towards the lower EU prices. If there has been border protection but no positive price difference we assume that the protection has been ineffective and that dismantling would not significantly stimulate price convergence to the EU (implied by max(.) operator of Equation (19)).

2.2.4 Treatment of subsistence farming

As stated above farmers are assumed to maximise profits. This is a simplification even in EU-15 countries due to labour, capital and insurance market imperfections such that risk aversion matters as well (Singh et al., 1986). In transition countries high transaction costs often generate a large difference between purchase and selling prices of non-storable goods, for example milk. Under these conditions it may be expected that farm households are frequently trapped in a price corridor rendering subsistence farming the optimal solution which differs from profit maximisation (De Janvry et al., 1991). In addition, transaction costs may be due to significant differences between marketable and subsistence qualities.

An appropriate modelling of subsistence requires the application of agricultural household models requiring information on non-agricultural activities, income, and consumption behaviour which is usually only available from special surveys. Furthermore the increase in model complexity would not be compatible with disaggregate agricultural sector modelling such that CAPSIM can only reflect subsistence farming in a pragmatic fashion similar to the approach explored earlier with ESIM[10]. This treatment is only intended to reflect the consequences of the decline in subsistence production, rather than to explain this decline. For the milk sector this is already an important achievement as the dairy sector is important and currently subject to the quota regime where subsistence production is exempted. The solution adopted by CAPSIM involves splitting up total production into production for the market (deliveries and direct sales to other households) and subsistence production consumed by the household itself (on farm food and feed use). In the preparation of the default trends (see Subsection 2.3.4) subsistence production is assumed to decline on average according to a fixed yearly change (2% per year) reflecting the gradual decline in transaction costs, structural change in the farming sector and other drivers, unless historical trends suggest an even faster decline. A certain share of this decline will increase commercial use of raw milk unless total production declines in the same amount:

$$PRD_{m,r,t} = DEMC_{m,r,t} + DEMS_{m,r,t} \qquad (20)$$

where

$PRD_{m,r,t}$ = total production of product r (raw milk) in MS m, year t

$DEMC_{m,r,t}$ = commercial production of product r in MS m, year t

$DEMS_{m,r,t}$ = subsistence production of product r in MS m, year t

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[10] See Banse and Grethe (2005) or Banse et al., (2005).

This balance is imposed in the simultaneous estimation of default trends such that changes in total production, commercial uses and subsistence use are tied together. For countries with a large share of subsistence production (Poland, Romania and most Western Balkan countries) these interrelationships will have a visible impact on the results.

2.2.5 Modelling of Labour

In Subsection 2.1.4 of Witzke and Zintl (2007) a pragmatic procedure to project labour use has been presented. That projection was linked to time and additional variables such as total agricultural income relative to non-agricultural income, or income in agricultural subsectors (e.g. livestock), selected on the basis of conventional fit. For the update of this pragmatic approach two explanatory variables apart from time were explored in ordinary least square (OLS) regressions, see Table 3.

Table 3: Regressions of relative changes in agricultural labour on time, relative income and unemployment

	Time	d(ln(Rel_Inc(-1)))	d(ln(Rel_Inc(-2)))	Uempl(-1)	Uempl(-2)	Intercept
Austria	0.0585					-3.7955
Belgium-Lux.	0.0777					-3.7931
Bulgaria			0.4608			-3.7931
Cyprus			0.2765			-1.4039
Czech Republic	0.1480					-8.7895
Denmark	0.0034					-3.4334
Estonia	0.1216					-6.3689
Finland					0.0675	-3.4183
France	0.0363					-3.5038
Germany				1.1350		-13.1520
Greece*	0.0210			0.0914		-1.2713
Hungary					0.8528	-11.5167
Ireland*	0.1734					-26.4361
Italy	0.0850					-5.0746
Latvia			0.0492			-1.5266
Lithuania	0.5242					-24.3239
Malta			0.2166		-3.1497	22.5597
Netherlands	-0.1219		0.1788			2.5896
Poland*	0.0221					-0.2340
Portugal	0.0636					-5.7291
Romania					-4.4144	27.2346
Slovac Republic			-0.0781			-7.6381
Slovenia	0.0563					-4.2371
Spain	0.1581	0.1087		0.2260		-8.9997
Sweden	0.0829					-4.4111
United Kingdom	-0.0214			0.0475		-1.6130

Note*: Time was transformed to impose non-increasing projections. The value given is the derivative with respect to time at 2012 = (2004+2020)/2.

The dependent variable agricultural labour has been expressed in first difference to reduce the danger of spurious regressions. These differences were taken in relative (or logarithmic) form to facilitate easy comparisons of countries. Given that observations are usually very few, even in EU-15 countries, statistical testing for unit roots and other time series properties (e.g. as in Hamilton, 1994) was neglected in favour of pragmatic reasoning. Relative income (Rel_Inc) was measured as agricultural gross value added at basic prices per labour unit relative to economy wide GDP per head. The income variable has also been taken in lagged relative difference form. In some countries the income variable was insignificant or implausible (wrong sign) at all lags but the unemployment rate was significant[11]. Growth rates are

[11] Negative signs for the twice lagged unemployment rate in Malta and Romania are difficult to explain. They have been accepted because the unemployment rate was held constant for the projections such that the unemployment rate basically only modifies the intercept.

significantly declining in most countries[12]. Note that an endogenous adjustment of labour use to agricultural income only occurs where the relative income variable was significant. This only holds for The Netherlands and Spain in EU-15 and for a few EU-12 members. For Western Balkan countries it was impossible to estimate labour use given the limited data information. Instead, this study relied on expert projections from ARCOTRASS (2006).

The pragmatic regression approach is unrelated to the assumption of a 50% fixed share for labour and capital, underlying the calibration of the profit function. It is assumed that a share of 50% of all factors benefiting from value added, mainly family labour and family own capital, but also some hired labour and debt, may be considered fully variable. These variable factors have alternative employment options in other sectors. The rest is considered fixed in the short to medium run. This covers family labour with insufficient skills for the general labour market or capital goods with a quasi-fixed character. So far the CAPSIM database does not disentangle labour and capital from this residual primary factor aggregate. Therefore the approach for labour modelling is not necessarily in conflict with the primary factor assumptions but it is admitted that labour use modelling and primary factor assumptions for the profit function are largely unrelated.

However it is quite clear that this pragmatic approach is mainly justified by the desire to include total labour (which is supposedly responding very slowly to agricultural variables) in the model output in order to compute per capita income effects. Of course this pragmatic form for incorporating labour gives a purely passive indicator, without feed back to the behavioural functions. Again an in depth modelling activity would require to apply a household approach which is unfeasible in disaggregate sector wide modelling.

2.2.6 Welfare measures

The welfare measures of all agents are added together:

- for agricultural producers, processing industry the change in profit from profit function gives the contribution to the welfare change;
- consumers' welfare change may be measured as equivalent variation from the indirect utility function;
- land owners are affected by a change in rents;
- the public sector component is the change in EAGGF expenditure;
- agents with fixed margins or prices (food industry, non-agricultural factor supply) are not affected;
- ROW welfare is ignored.

In Computable General Equilibrium (CGE) applications such as the GTAP real income is frequently used as a welfare indicator because it is a by-product of any simulation results. The real income change from a CGE is conceptually quite similar to the welfare change derived

[12] Note that the dependent variable, the relative change of agricultural labour, is usually a negative number. A positive coefficient for time thus indicates that this negative change is becoming less negative over time, i.e. migration rates out of agriculture are declining.

from partial equilibrium models: the nominal income change in a CGE corresponds to the total producer welfare change across all sectors affected. The aggregate consumer benefits from this nominal income gain as the owner of factors but consumer welfare may decrease at the same time from price increases. Taking the difference of nominal income gain and losses in consumer welfare corresponds to deflating the nominal income change. Most CGE models also permit to derive the welfare change from the indirect utility function of consumers. While these differences may be interesting in theoretical terms, they do not appear to be very relevant for agricultural sector modelling.

2.3 DATABASE

2.3.1 Raw data

In total the revised product list of CAPSIM includes 21 agricultural outputs, 5 inputs (imported energy rich feed mainly manioc, protein rich feed mainly corn gluten fodder, a primary factor aggregate, labour, intermediate consumption) and 11 processed products. The largest part of the database is filled from various DG ESTAT domains and comprises areas, crop and animal production, market balance positions, price data consumer expenditure, and macroeconomic variables.

Where the above are not available from DG ESTAT they are sometimes collected in related projects (such as the JRC-IPTS tender on Database for Agricultural Sector Modelling, Contract No. 150619-2006 F1SC-DE) and supplied in CSV (Comma Separated Values) or Excel files. This holds for the NMS, for Western Balkan Countries and Turkey.

In addition there are a number of supplementary data from various sources:

- policy variables: Official Journals, Directorate General for Agriculture and Rural Development (DG AGRI) website, WTO website, EAGGF reports;

- supplementary trade data (if market balances are unavailable): FAO;

- consumer prices: International Labour Organisation (ILO);

- world market projections: The Food and Agricultural Policy Research Institute (FAPRI).

2.3.2 Data reconciliation

It may be noted that national and DG ESTAT data, but also different DG ESTAT domains and sometimes even the numbers in a single market balance are not necessarily consistent with each other. For a number of years already the database at the level of EU MS is shared between the CAPRI and CAPSIM modelling systems and teams. The modelling database is established in a routine called Complete and Consistent Data Base (COCO) based on various types of official data (see Section 2.3 in Britz, 2005). This routine allows for conversion of units, trend based completions, mechanical corrections of presumed data errors while imposing some minimal technical consistency in terms of adding up constraints for areas and so forth.

The COCO module is basically divided into two main parts:

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

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

The first part had to be changed recently in several respects to make use of new information collected under the related CAPSIM database tender (JRC-IPTS tender on Database for Agricultural Sector Modelling, Contract No. 150619-2006 F1SC-DE, see Witzke et al., 2008). The second part was historically written in a quite generic form because the raw data (from various sources) had been combined already, in a preliminary form, on a single array. Subsequent optimisation problems try to consolidate given raw data in a normalised least squares framework with technical constraints while deviating as little as possible from the raw data. At the same time gaps are closed, in line with the constraints. An update to a new database or inclusion of additional raw data will usually require to check the results and to adjust certain steering parameters, but significant changes in the code have not been necessary in the last update. However a serious double counting, both in the DG ESTAT area statistics as well as in the COCO database, has been encountered while investigating in detail the cotton sector of Turkey. Fixing this problem turned out more cumbersome than initially expected.

2.3.3 Elasticities

The supply side parameters of CAPSIM will be calibrated to the three year average 2003/05 as a base year according to the methodology described in Witzke and Zintl (2005) relying on scattered evidence in the literature. The procedure essentially starts with a set of assumed Allen elasticities of transformation (AET)[13] and additional separability assumptions to produce full parameter matrices ($\alpha_{m,j,k}$ from Equation (1)) based on minimal MS specific information in addition to the base year data.

On the demand side parameters (e.g. $\beta_{m,u,i}$ from Equation (6)) have been specified in view of results of Seale, Regmi, Bernstein (2004) which are quite attractive for our purposes in many respects:

1. the reported elasticities[14] appear to be reasonable in level and in their variation with income;

2. their data base is quite up to date (1996);

3. complete coverage of all MS with the same methodology may be achieved.

2.3.4 Default trends

In the reference run mode of CAPSIM deviations from the mean of external projections are minimised subject to the equations of the model. External projections usually come from DG AGRI or FAPRI for major variables of interest but for many less important variables, CAPSIM is relying on default trends calculated by the CAPRI trend estimator based on the common CAPRI/CAPSIM database (see Witzke and Zintl, 2007, Subsection 2.3.2 and Britz,

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[13] $AET_{m,j,k,t,} = (\pi_{m,j,k,t}\times\pi_{m,t})/(\pi_{m,j,t}\times\pi_{m,k,t})$, with $\pi_{m,j,t} = \partial\pi_{m,t}/\partial N_{m,j,t}$ and $\pi_{m,j,k,t} = \partial\pi_{m,j,t}/\partial N_{m,k,t}$ see Equation (1).

[14] The study reports for aggregate food items compensated (or Hicks-Slutsky) elasticities, uncompensated (or Cournot- Marshallian) elasticities, and Frisch (constant marginal utility) elasticities. Due to some drawbacks of the applied functional form, the authors only report the Frisch elasticities for disaggregated food items (Seale et al., 2003, p.39) such that these have been used to estimate the initial Hicksians for the calibration.

2005 Section 4). Even though trend estimates will always be mechanical and ignorant of policy changes, a number of intelligent safeguards are built into these trends to render them reasonable.

The first of these is a trend function ($a + b \cdot t^c$, $0 \leq c \leq 1.2$) restricting the maximum change over time. Secondly more recent observations receive a larger weight in the objective due to a presumably higher data quality (and for NMS observations before a certain year have been ignored). Finally and most importantly the trends follow from a two-step procedure where the forecast of a series with a bad fit is pulled towards the most recent base year data. Step 1 consists of finding independent trends for all series in the database. In a standard forecasting effort, the trend term would be ignored if the t-value of the associated trend parameter did not exceed conventional significance levels. We applied this rule in a continuous form rather than with a threshold significance level (noting the relationship of R^2 to the t value in univariate regressions[15]). For this purpose we defined a target value for Step 2 as the average of the base-year value weighted by $(1-R^2)$ and the projection value from the first step weighted by R^2. Weighting the Step 1 forecasts with R^2 tends to produce conservative target values close to the base year value in case of poor fit (low R^2).

Step 2 introduces a third group of safeguards. This is a quite exhaustive set of technological constraints and identities tying together the series: if we run independent trends for, say, the pulses area, yield and production, the forecasts would almost certainly violate the identity linking the three series. One solution would be to drop one of the three from the estimation, for example the yield, and to compute it later from the forecasts of the two other series. By doing so, however, we would ignore the information incorporated in yield observations, which is avoided in our simultaneous approach. Consequently, we have imposed several balances (for feed energy and crude protein, milk fat and protein in dairies, markets including land and non-tradable young animals) and identities (production = activity levels × yields, values = quantity × price, consumption = per capita consumption × population, aggregates = sum of components). Furthermore, for several variables assumed to change only slowly, maximum yearly growth rates have been defined, e.g. for total agricultural area (max. ± 0.5% per year), and for most yields negative growth has been precluded. Step 2 forecasts are those values that minimise normalised squared deviations from the targets while meeting all the above technical constraints. Normalisation occurs using the standard errors of the trends from Step 1. As these are smaller for well fitting trend these should prevail over imprecise trends in case of conflicting evidence. The results of this procedure are merged with other external information.

2.4 SCENARIO AND REFERENCE RUN MODE

An explained in the introduction all parameters are given in the standard, policy simulation mode and exogenous inputs are usually taken over from the reference run. In contrast, the reference run mode is used to calibrate the unknown time-dependent parameters (shifters) in

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[15] In a univariate regression the t-value and R^2 are related as follows: $t^2 = (obs-2)*R^2/(1-R^2)$, see for example Greene 1993, p. 162. Therefore a weight of projection results with R^2 equals a weighting of projection results with a monotonically increasing function of the t-value. Hence projections with low t-values receive a low weight relative to the base year value rather than being discarded altogether below some threshold value. That would be the 'classical' approach in econometrics.

model equations, building on exogenous forecasts and ex-post observations for the related variables (i.e. the activity levels).

Key driving forces of agricultural market developments are difficult to capture explicitly with standard models based on microeconomic theory. This holds for certain long run developments such as farm structure changes, for taste shifts on the demand side, for diffusion of technological progress and new technological developments (e.g. second generation bio-fuels). These may modify or even compensate the operation of typical driving forces such as price ratios. Sometimes it is possible to capture these drivers based on econometric analysis or based on expert assessments as well known agencies publishing agricultural outlooks usually do (OECD, FAO, FAPRI, DG AGRI). The same is possible for specific market outlooks, such as in the recent EDIM study (Réquillart et al., 2008). External forecasts typically provide estimates for the exogenous variables in modelling work. The innovative characteristic of CAPSIM is that expert forecasts are also used to specify selected model parameters related to endogenous variables which might be affected by structural change of any kind. A CAPSIM reference run is, thus, set up as a simultaneous estimation and forecasting effort permitting to integrate various, to some extent contradictory, expert forecasts subject to the equations of the sector model and to estimate behavioural functions shifters providing the closest fit to these forecasts (Witzke and Britz, 2005).

The reference run consolidates the information incorporated in:

- possibly contradictory expert forecasts and default trends;
- ex-post data (base year information).

In essence, expert forecasts are treated as if they were ex-post observations, and the development of shifters is chosen to maximise the fit of model outcomes compared to observed or forecast information. A well-known interpretation of an optimal compromise between distinct pieces of a priori information is provided by a cross-entropy approach (Golan et al., 1996). However, the cross-entropy approach turns out to be impractical in this large scale modelling effort, because it introduces for each variable of interest auxiliary variables (probabilities) and equations (probability sum, posterior mean of supports). In this study, we used an attractive and computationally less demanding alternative, the Highest Posterior Density (HPD) estimator (Heckelei et al., 2005).

This results in a quite convenient quadratic objective function if we assume a normal prior distribution. Finally, it also turns out useful to introduce additional weights in the objective function characterising the importance of the variable in question, because some variables are deemed more important, e.g. the soft wheat area in France, than others, e.g. the 'Sheep and goat' herd in Finland. Importance is measured both as the (quantity) share in EU totals and as the share in the (monetary) national totals, which are combined with equal weights.

The final objective function chosen looks as follows:

$$obj = \sum_{r,i,j} obwgt^{j}_{r,i} \times \left(\frac{X^{j}_{r,i,t} - \overline{X}^{j}_{r,i,t}}{\sigma^{j}_{r,i,t}} \right)^2 + \sum_{r,j} obwgt^{j}_{r,sh1} \times \left[\frac{\left(\alpha^{j}_{r,i,t} - \alpha^{j}_{r,i,tb}\right) / (t-tb)}{X^{j}_{r,i,tb}} \right]^2 \tag{21}$$

where

$X^{j}_{r,i,t}$ = variable in row i, column j, region r and year t (t = 2020)

$\overline{X}^{j}_{r,i,t}$ = mean support (from DG AGRI, FAPRI, trend/ex-post) for variable in row i, column j, region r and year t

$\sigma^{j}_{r,i,t}$ = prior standard deviation[16] for variable in row i, column j, region r and year t

$obwgt^{j}_{r,i}$ = objective function weight for deviation from mean support in row i, column j, region r and year t

$obwgt^{j}_{r,i,sh1}$ = objective function weight for total yearly shifts of behavioural parameters for row i, column j, region r (first difference penalty)

$\alpha^{j}_{r,i,t}$ = time dependent parameter (to be estimated) in row i, column j, region r and year t (t = 2020, tb = base year 2004)

The first term penalises squared deviations from the mean support which are avoided therefore, as far as possible, by varying the shifters $\alpha^{j}_{r,i,t}$. With free shifters, the model would usually be able to exactly reproduce given ex-post data or projections, just as the model may be calibrated to any consistent set of base year data. However as the following term puts a penalty on some changes in shifters, an exact fit will not be optimal.

The second term penalises parameter shifts, expressing the a priori expectation that, while shifts are not excluded, parameters will normally remain stable. Some experiments have shown that a moderate relative weight of 10% for the first difference penalty compared to the absolute deviations of the corresponding variable turns out to give plausible results in general. The above objective function is an update of Witzke et al., (2004) or Witzke and Britz (2005).

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[16] The prior standard deviation has been derived from the bounds on the variables which act as 'outer supports' for the calculation of this standard deviation. A tight spread between the lowest and highest support, signalling rather precise a priori expectations, thus leads to a low standard deviation. Alternatively we may have used the standard deviations from the default trends described in Section 3.4. This would give a more objective but also more mechanical decision criterion. The current procedure goes back to the entropy approach used in earlier versions of CAPSIM which has been criticised as somewhat arbitrary due to the necessity to specify the supports (e.g.: Heckelei et al., 2005). However the bound based procedure has been retained due to its ease of application.

For external information, we used the following items:

1. activity levels (mainly for crops);
2. yields (mainly for crops);
3. production (for animals and processed items);
4. demand (total, human consumption, feed, processing);
5. trade (net trade, imports, exports);
6. prices (EU prices, world market prices).

Other variables largely depend on these key variables. Producer prices at MS level, for example, are in most cases derived from the EU prices through the price linkage equation (16), see Subsection 2.2.3. Income may be calculated once prices and quantities are known. In this way, the closed-sector model framework helps to conveniently complete the quantitative predictions in line with the predictions for key variables.

It should be noted that the shifts in behavioural functions will capture structural changes in agriculture. If a larger percentage of milk is delivered to dairies and marketed through the food system, this may change the quantity and composition of milk products at given prices. This may be expressed with shifting behavioural functions and would be reflected in the reference run projections.

3 REFERENCE RUN

3.1 DEFINITION OF REFERENCE RUN

The reference run[17] (acronym 'REF' in result tables) includes recent CAP reforms[18], price developments in line with FAPRI and EDIM and some forecasts on policy driven variables such as set-aside aligned with those of DG AGRI. Table 4 reproduces key policy variables for price support to particular products.

Table 4: Price support related policy variables for the base year (2003-05) and year 2020

	2003-05	2020
Administrative prices [€/ton]		
Wheat	101.3	101.3
Coarse grains	101.3	101.3
Rice	199.5	150.0
Sugar	631.9	404.4
Beef	2224.0	2224.0
Butter	2747.6	2217.5
Skimmed milk powder	1952.4	1650.5
Subsidies [m €]		
Casein (EU27)	165.4	
Butter (EU27)	505.0	
Fresh milk (EU27)	66.0	66.0
Skimmed milk powder (EU27)	166.2	
Other industrial crops (Greece)	686.6	242.6
Potatoes & vegetables (Greece)	87.8	
Edible fruit (Greece)	66.3	

Administrative prices for Cereals are maintained until 2020 apart from rice where the reduction in the intervention price from the Luxembourg reform was only implemented by 33% in the base year data. Further price cuts are brought about by the sugar market reform and the modified price cuts for dairy products dating back to the Agenda 2000 decision. Note that the administrative price for 'Butter' is the buying in price (90% of the intervention price) and that the future intervention price for 'Skimmed milk powder' is further reduced according to the so called mini milk reform (see details below).

Most subsidies to stimulate consumption of certain products will be abolished. This is likely to apply to the subsidies for casein production and use of 'Butter' and 'Skimmed milk powder', whereas subsidies for school milk are assumed untouched. Whereas subsidies in the dairy sector have been converted to a uniform amount per ton in all EU MS, other subsidies are introduced in different amounts per MS based on EAGGF data because the composition of aggregated crops may strongly differ from country to country. The aggregate 'other industrial crops' for Greece, selected as an example in this table, includes cotton aid which is partly included in the Single Farm Payment (SFP) such that product related support decreases strongly in Greece. Note that tobacco support is not included in Table 4 because this is handled as a premium to producers in CAPSIM. Different handling of support is usually motivated by its treatment in the EAA (not covering aid paid to ginners of cotton, for example). Subsidies shown for potatoes and vegetables, as well as and edible fruits are for processing and have been eliminated in the recent reform of the vegetable and fruits sector.

[17] Because we are not simulating a complete time series but rather selected years we will use 'reference run' here, rather than the common term 'baseline'.

[18] Except on wine as EU Regulation 479/2008 only dates from 29.06.2008.

The key source for all premium related policies is Regulation 1782/2003 which is fortunately offered in consolidated form on the Eur-LEX server (EU Commission, 2008a). The following aspects of EU Commission (2008a) are included in CAPSIM: total payment amounts for coupled and decoupled support; sugar payments; specific support to tobacco, cotton, olives, hops; amounts exempted from modulation due to the franchise.

It has been assumed that future payments would be close to the ceilings given in Regulation 1782/2003 such that these may be taken as expenditure forecasts. In terms of the implementation in EU MS, in particular the decoupling degree and the choice of NMS on the SFP vs. Single Area Payment Scheme (SAPS), this study relied on EU Commission (2008b), but ignoring the details of the Article 69 implementation.

In two areas, earlier DG AGRI analyses were directly incorporated in the CAPSIM reference run. The first is the future development of obligatory and voluntary set-asides which are given until 2014 in the March 2008 Prospects publication (EU Commission, 2008c, Table A8). The second is the future development of 'Sugar' production in the EU which has been aligned with EU Commission (2005).

In terms of future international price evolution, this study relied on FAPRI projections which were kindly provided in electronic form upon request[19]. For dairy products, however these were averaged with projections from Réquillart et al. (2008) which received a doubled weight compared to FAPRI (see Figure 4).

As a new WTO agreement is not yet concluded and DG AGRI projections so far also ignored this, a WTO agreement in the reference run is ignored. However an abolition of export subsidies has also been simulated, all else equal as an additional sensitivity analysis.

In terms of dairy the accepted 2% quota increase in 2008 is implemented already in the reference run but further expansion in view of a soft landing will be part of the expiry scenario. The reference run also includes the mini milk reform (EU Commission, 2008c) that allows standardising the protein content of 'Skimmed milk powder' at 34% (in line with international Codex Alimentarious provisions) whereas the previous standard for intervention was 35.6%. It is expected that this would lead to reduced protein contents of powders which might be translated into an exogenous decrease in the protein content of powders of 1.6 percentage points[20] and the related subsequent lowering of the intervention price for 'Skimmed milk powder' by 2.8% effective from September 2008.

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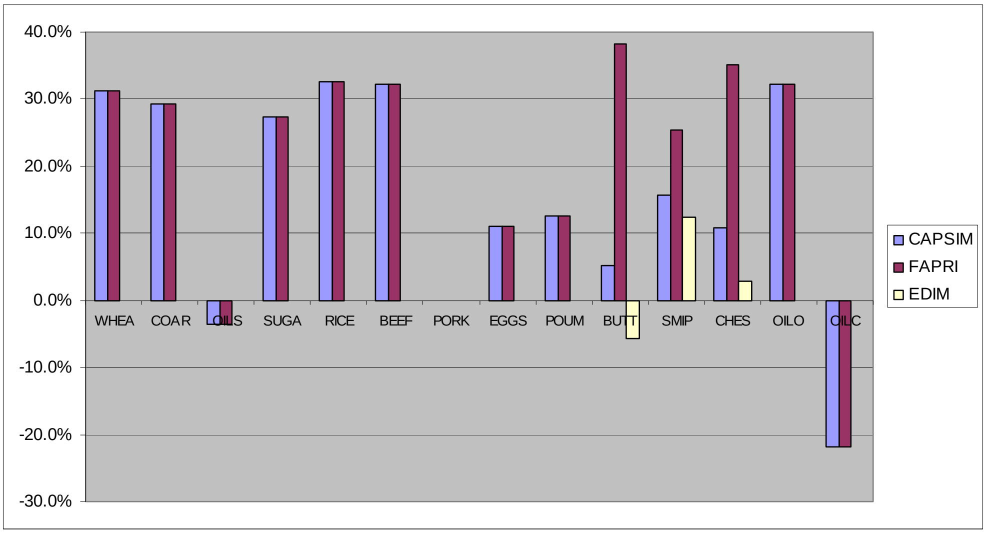
[19] As the FAPRI projections were only running to 2016 they have been extrapolated to 2020. Furthermore we used the DG AGRI projection (1 USD = 0.80 €) for the conversion to € rather than the lower exchange rate assumed by FAPRI (1 USD = 0.71 €).

[20] It should be acknowledged that protein contents specific for single MS are only estimated from the data reconciliation routine COCO and may not correctly identify the MS with content above or below 35.6%, the old basis for the skimmed milk powder intervention price. It is proposed to apply a uniform decrease of 1.6 percentage points in the protein content in all MS assuming that this will reflect the average impact of the reduction of the standard to 34%.

Figure 4: World price assumptions in the 2020 CAPSIM reference run [% change]



Note: WHEA = Wheat, COAR = Coarse grains, OILS = Oilseeds, SUGA = Sugar, RICE = Rice, BEEF = Beef, PORK = Pork, EGGS = Eggs, POUM = Poultry meat, BUTT = Butter, SMIP = Skimmed milk powder, CHES = Cheese, OILO = Vegetable fats and oils not from olives, OILC = Oil cakes.

The CAPSIM reference run will be simulated for 2014, the last year before the scheduled quota expiry, and 2020. Comparative static models designed for medium run projections such as CAPSIM, CAPRI, and GTAP cannot predict the short-run impact immediately after the quota expiry in 2015. This is because 2015 results would be strongly affected by adjustment lags due to gradual move to the new optimum on the part of farmers. In technical terms the dairy herd cannot be suddenly expanded but would require a period of reduced slaughtering of female calves and additional raising of heifers. But also behavioural lags will contribute to the fact that 2015 will be a period of uncompleted adjustment to the new equilibrium. Hence it is more appropriate to make the main comparisons with the reference run a few years after the quota expiry, when adjustment to the new equilibrium may be expected to be quite complete, for example the year 2020 which has also been investigated in Réquillart et al., (2008) and thus may be compared with those results. However, in view of a hypothetical early quota expiry in 2009 we will also carry out simulations for 2014 which are to some extent comparable to those from the dynamic EDIM model in Réquillart et al., (2008).

Two additional reference runs are needed for the sensitivity analyses as explained in Section 4.1 below. For better linkage of sections all reference runs are summarised in Table 5. The additional reference runs are first 'REF-HIGH', a reference run computed under the assumption of HIGH quota rents. Finally 'REF-NOSUB' is the reference run computed under the assumption of abolished export subsidies. This table also indicates counterfactual simulations carried out for the base year 2004 that may be considered as ex-post validation because unlike the pure calibration result, these results shed some light on the responsiveness of CAPSIM.

Table 5: Overview on CAPSIM reference runs performed in this study

Acronym	Milk quotas	Export subsidies	Initial rents	2004	2014	2020
REF	Legal status quo	Active	Default	☒	☒	☒
REF-HIGH	Legal status quo	Active	High			☒
REF-NOSUB	Legal status quo	Abolished	Default	☒		☒

3.2 RESULTS OF REFERENCE RUN

Key driving forces of agricultural market developments are difficult to capture explicitly with standard models based on microeconomic theory. This holds for certain long-run developments such as: farm structure changes, taste shifts on the demand side, diffusion of technological progress and new technological developments (e.g. second generation bio-fuels). These developments may modify or even compensate the operation of typical driving forces such as price ratios or activity related premiums as presented in Section 3.1. Several agencies try to capture these drivers, as well as possible, based on econometric analysis or based on expert assessments (OECD, FAO, FAPRI, DG AGRI) which also applies to the recent EDIM study on dairy markets (Réquillart et al., 2008).

A characteristic of CAPSIM is that the reference run is set up as a simultaneous estimation and projection effort permitting to integrate various expert projections subject to the model equations and to estimate those shifts of behavioural functions providing the closest fit to these projections. This procedure gives significant weight to external information which consequently reduces the weight for the economic mechanisms in CAPSIM in the determination of the reference run results (see Section 3.1). This has two consequences:

- results to a large extent depend on the quality of external projections (in this study: CAPRI trends, partly aligned with DG AGRI projections, FAPRI, and EDIM);
- results are difficult to interpret solely based on the model equations, as certain parameters are allowed to change (fixed subsequently for policy scenarios).

Hence it appears useful to present the reference results in more aggregate style than in the typical narrative for particular policy scenarios. The main purpose is to highlight over time the main changes, which are relevant for an appropriate interpretation of subsequent policy scenarios.

Key results are certainly the price changes on EU markets relative to the world price assumptions, shown in Section 3.1 because they determine the importance of border measures for agricultural markets. On several markets it is expected that international prices are rising faster than EU prices such that export subsidies would be zero. This holds for Cereals and dairy products except 'Butter'. For 'Butter', 'Beef', and 'Sugar' this increase in international prices and the simultaneous decline of EU prices are strongly reducing export subsidies, but not to zero. Finally there is the large group of products where EU market management is assumed to maintain the initial protection. In these cases EU prices are basically following international price movements, for example in the cases of 'Pork', 'Poultry meat', 'Eggs', or 'Oilseeds' and their derivates.

Results for the intermediate period 2014 are closer to 2020 than 2004. The first reason is of course that 2014 is closer to the final projection year than to the base year 2004. Furthermore some policy reforms are phased in the first years (Luxembourg, sugar reform) and after that the policy is assumed to be maintained until 2020.

Table 6: Market prices and export refunds for key products in the CAPSIM reference run, 2004 to 2020 [€/t]

		2004			2014			2020			2004 to 2020 [%]		
		Market price	Export refund	Export price	Market price	Export refund	Export price	Market price	Export refund	Export price	Market price	Export refund	Export price
Wheat	EU	106	2	104	123	0	123	137	0	137	*+29.5*	*-100*	*+32.6*
	World	106			127			139			*+31.3*		
Coarse grains	EU	106	13	93	117	0	117	130	0	130	*+22.5*	*-100*	*+40.0*
	World	100			118			129			*+29.4*		
Oilseeds	EU	201	0	201	196	0	196	194	0	194	*-3.6*		*-3.6*
	World	201			197			194			*-3.5*		
Potatoes & veget.	EU	256	4	252	305	4	302	339	4	335	*+32.5*	*+0.0*	*+33.0*
	World	233			278			306			*+31.3*		
Fruits	EU	495	4	491	498	4	494	500	4	495	*+0.9*	*+0.0*	*+0.9*
	World	495			495			495			*+0.0*		
Sugar	EU	632	269	363	410	30	380	411	13	398	*-35.0*	*-95.2*	*+9.6*
	World	206			241			262			*+27.3*		
Rice	EU	331	36	295	400	0	400	441	0	441	*+33.4*	*-100*	*+49.7*
	World	329			396			437			*+32.6*		
Beef	EU	2783	272	2511	2800	156	2644	2805	131	2673	*+0.8*	*-51.7*	*+6.4*
	World	1261			1515			1668			*+32.3*		
Pork	EU	1300	15	1286	1292	15	1277	1272	15	1258	*-2.2*	*+0.0*	*-2.2*
	World	1286			1286			1286			*+0.0*		
Sheep/goat meat	EU	4296	0	4296	5024	0	5024	5418	0	5418	*+26.1*		*+26.1*
	World	2885			3467			3816			*+32.3*		
Eggs	EU	928	260	668	1000	260	740	991	260	731	*+6.8*	*+0.0*	*+9.4*
	World	668			714			742			*+11.0*		
Poultry meat	EU	1215	73	1142	1291	73	1218	1314	73	1241	*+8.1*	*+0.0*	*+8.7*
	World	1142			1232			1286			*+12.6*		
Butter	EU	3549	2489	1059	2881	1619	1262	2882	1604	1277	*-18.8*	*-35.5*	*+20.6*
	World	1413			1459			1487			*+5.3*		
Skim. milk pwd.	EU	1944	755	1189	1910	0	1910	2069	0	2069	*+6.4*	*-100*	*+73.9*
	World	1586			1741			1834			*+15.7*		
Cheese	EU	4632	487	4144	4586	0	4586	4671	0	4671	*+0.9*	*-100*	*+12.7*
	World	2025			2163			2245			*+10.9*		
Whole milk pwd.	EU	2414	1098	1316	2234	0	2234	2516	0	2516	*+4.2*	*-100*	*+91.2*
	World	1652			1772			1844			*+11.6*		
Veg. oils, no olive	EU	1631	0	1631	2009	0	2009	2235	0	2235	*+37.0*		*+37.0*
	World	1631			1959			2156			*+32.2*		
Oilcakes	EU	136	0	136	117	0	117	106	0	106	*-22.3*		*-22.3*
	World	136			117			106			*-21.9*		

Price changes, policy measures and other more structural developments determine the shape of agriculture in 2020. An important policy measure underlying the reference run is that the milk quota regime is not reformed such that milk quotas are an important determinant for dairy markets. Given that many scenarios investigated in this study are related to dairy, it is useful to continue the analysis of agricultural markets with dairy cows and the raw milk balance.

Compared to the base year 2004 there will be a number of quota expansions in many EU-15 countries that date back to the Luxembourg agreement (standard increase of 1.5% as of 2006) and a few exceptional increases, in particular in Greece where recent delivery data seem to show that this expansion is indeed being taken up. On top, there will be the recently decided 2% expansion in all MS as of 2008. However this quota increase does not lead to a similar expansion of production in all MS, in particular in those with a near zero quota rent. Hence, the quota restricted deliveries and direct sales increase by about 3.2% only in the EU-15. Total production increases even less because it is assumed that own consumption on farms, for food or feed, (and corresponding subsistence production) would strongly decline in all European countries. The small subsistence share of about 4% further reduces on average in the EU-15 the growth of production to 2% (see page 31, Table 7).

The subsistence share is much higher in the base period in the 10 NMS (23%), and in particular in Romania (42%). As a consequence, even though there will be some filling of quotas for deliveries and direct sales, the aggregate change in the raw milk balance is also influenced by the decline in subsistence production[21]. It has been assumed that this would decline by 2% per year, unless historical trends suggest an even faster decline. In the NMS there would remain a small increase of 0.7% by 2020 compared to 2004 but in Bulgaria and Romania (EU-02) production would decline by 8%. The situation is again different in the Western Balkans. While the decline of subsistence production also applies, together with a high initial share in total production (31%), deliveries would strongly expand with increased commercialisation and absence of quota constraints such that total production is expected to increase by 18.1% until 2020.

Raw milk prices are an equilibrium outcome of the supply side and demand side shifts. Supply side shifts are either controlled by quotas or resulting from trends on yields and endogenous adjustments of herd sizes (Western Balkans and MS with non-binding quotas). Derived demand from dairies depends on productivity gains, dairy prices but also on national inflation which is determining the increase in labour, capital, energy and other inputs of dairies. In the NMS price developments are most favourable to farmers whereas in the EU-02 prices could decline by 13%[22]. Herd sizes in the EU-27 are adjusting to quotas, given increasing yields. On the Western Balkans, on the contrary, dairy herds are likely to increase according to historical trends. Rents tend to be stable in the EU-15 as changes in milk prices, input prices and yield gains approximately cancel. For Poland, the Czech Republic and the EU-02 it is expected that productivity gains would decrease marginal costs below milk prices such that positive rents are emerging whereas for other EU-10 members quotas would not be binding. These properties of the reference run will strongly determine the expiry impacts obtained in policy scenarios.

It is noteworthy that quota rents would decline from the base year 2004 to 2014 due to several policy measures implemented between 2004 and 2014:

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[21] Members of the EU-15, apart from The Netherlands and the UK, show a clearly downward sloping trend of own consumption. In the EU-10 there are several countries where unconstrained trends would have yielded an increase in own consumption. If these are considered temporary phenomena, based on plausibility considerations, the constraints mentioned in the text are justified and force the projections for all the EU-10 members on a downward sloping path. However, this path implies a slower decline than in the EU-15 where it is materialising without force.

[22] It is admitted that this is surprising against the expectation of some price convergence within the EU-27 even for 'non-tradable' items like raw milk. Facilitating the intra EU price transmission, however, would have implied across borders higher raw milk trade which was considered implausible. The particular circumstance likely to drive the decrease in EU-02 prices is the strong decline in fresh milk production in Romania which is the most important dairy product in the largest member of the EU-02. This will imply a decline in demand from dairies which tends to reduce prices. Nonetheless the result remains surprising and is not advocated here as an important new 'finding' of this study.

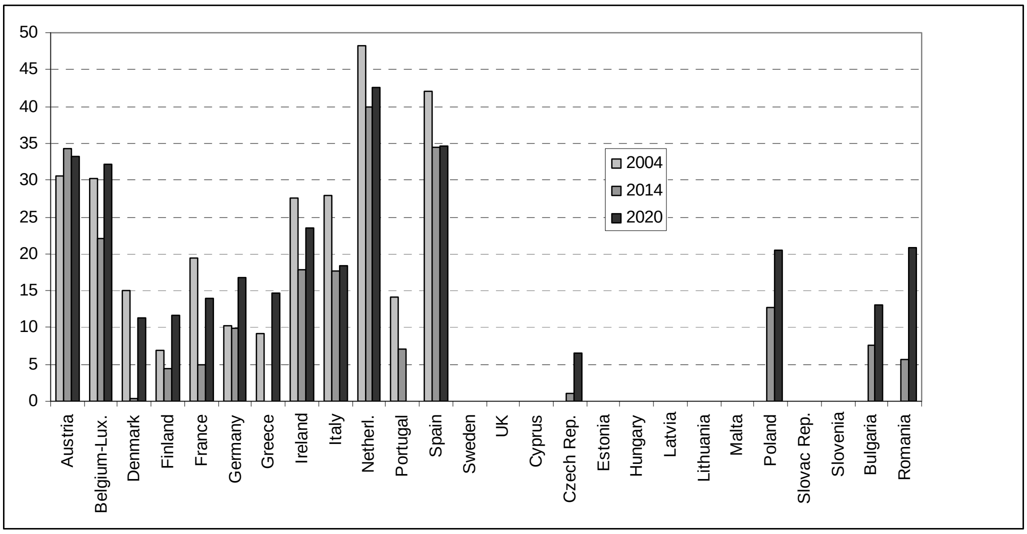
- the full application of intervention price cuts from Agenda 2000 and from the mini-milk-package in 2007[23];

- the abolishment of subsidies for use of 'Butter', 'Skimmed milk powder' and casein;

- the remaining quota expansions from Agenda 2000 (in most EU-15 countries 1.5%) supplemented with the 2008 increase for all MS by 2%.

These measures are somewhat counteracted by demand growth but on balance prices for dairy products and cow milk are expected to decline between 2004 and 2014 (Table 6 and Table 7). Even though yields would also increase it appears that profitability of dairy farming would decline over some years such that quota rents in 2014 would be lower. Note however that the effect of the above policy measures is temporary only. By 2020 demand growth and improvements in milk yields are expected to drive up quota rents again. This is the general pattern of developments in EU regional aggregates (Table 7) but at the level of single MS the development may deviate somewhat from these general lines (Figure 5).

Figure 5: Quota rents in the reference run for 2004, 2014, and 2020 and members of the EU-27 [% of raw milk prices]



[23] See EU Commission, 2007c.

Table 7: Market developments in the reference run: Cow milk [quantities: 1000 t, prices: €/t]

	2004					2014					2020					2004 to 2020 [%]			
	Production	Deliveries	Direct sales	Own cons.	Net trade	Production	Deliveries	Direct sales	Own cons.	Net trade	Production	Deliveries	Direct sales	Own cons.	Net trade	Production	Deliveries	Direct sales	Own cons.
EU15	123935	118482	1071	4941	-559	126603	121831	1122	4205	-556	126358	122295	1106	3515	-558	*+2.0*	*+3.2*	*+3.3*	*-28.9*
EU10	21341	15964	356	4930	90	21732	16798	386	4462	86	21483	16859	385	4154	86	*+0.7*	*+5.6*	*+8.0*	*-15.7*
EU02	6451	1812	2154	2488	-2	6157	1913	2133	2113	-1	5932	1866	2179	1887	0	*-8.1*	*+3.0*	*+1.2*	*-24.2*
EU27	151727	136259	3581	12358	-471	154492	140542	3641	10780	-471	153773	141019	3670	9555	-472	*+1.3*	*+3.5*	*+2.5*	*-22.7*
Western Balkan	4307	1848	1145	1319	-6	4740	2514	1199	1032	-6	5086	3018	1213	861	-5	*+18.1*	*+63.4*	*+5.9*	*-34.8*

Table 8: Dairy cow results for the reference run

	2004					2014					2020					2004 to 2020 [%]			
	Price [€/t]	Yield [kg/hd]	Gross revenue [€/hd]	Rent [%]	Herd size [1000 hd]	Price [€/t]	Yield [kg/hd]	Gross revenue [€/hd]	Rent [%]	Herd size [1000 hd]	Price [€/t]	Yield [kg/hd]	Gross revenue [€/hd]	Rent [%]	Herd size [1000 hd]	Price [€/t]	Yield [kg/hd]	Gross revenue [€/hd]	Herd size [1000 hd]
EU15	283	6468	2214	20	19161	266	7384	2279	13	17146	295	7922	2648	18	15951	*+4.3*	*+22.5*	*+19.6*	*-16.8*
EU10	195	4827	1074	0	4421	199	5950	1328	7	3652	221	6611	1606	12	3249	*+13.2*	*+37.0*	*+49.5*	*-26.5*
EU02	202	3474	850	0	1857	178	3736	821	6	1648	175	3887	821	19	1526	*-13.4*	*+11.9*	*-3.4*	*-17.8*
EU27	267	5964	1916	15	25439	253	6883	2017	12	22446	280	7419	2350	17	20726	*+4.9*	*+24.4*	*+22.6*	*-18.5*
Western Balkan	221	2247	750	0	1916	211	2431	695	0	1949	213	2547	719	0	1997	*-3.5*	*+13.4*	*-4.1*	*+4.2*

The changes in deliveries shown in Table 7 will change dairy outputs in such a way that milk fat and protein balances are cleared. Nonetheless this condition permits some shifts among products (Table 9).

Table 9: Market developments in the reference run: Dairy products [1000 t]

	2004			2014			2020			2004 to 2020 [%]	
	Production	Demand	Net trade	Production	Demand	Net trade	Production	Demand	Net trade	Production	Demand
Butter											
EU15	1873	1853	19	1716	1820	-104	1666	1785	-120	*-11.1*	*-3.7*
EU10	223	205	18	203	200	3	227	192	34	*+1.7*	*-6.0*
EU02	14	16	-2	13	20	-7	15	21	-6	*+6.2*	*+31.5*
EU27	2110	2074	35	1933	2041	-108	1907	1999	-92	*-9.6*	*-3.6*
Western Balkan	7	13	-7	7	16	-9	9	18	-8	*+36.7*	*+32.5*
Skim. milk pwd.											
EU15	896	878	18	694	853	-159	642	823	-181	*-28.4*	*-6.2*
EU10	187	46	141	153	56	97	146	48	98	*-21.8*	*+3.2*
EU02	13	19	-6	11	21	-10	13	21	-8	*-1.6*	*+9.1*
EU27	1097	944	153	858	930	-72	802	892	-91	*-26.9*	*-5.4*
Western Balkan	4	8	-4	6	11	-5	8	12	-4	*+83.9*	*+45.0*
Whole milk pwd.											
EU15	754	398	356	503	449	53	480	445	35	*-36.4*	*+11.9*
EU10	76	53	23	51	64	-13	46	58	-12	*-39.4*	*+9.6*
EU02	8	11	-3	5	12	-7	6	11	-5	*-22.5*	*-2.0*
EU27	838	462	376	558	525	33	532	514	18	*-36.5*	*+11.3*
Western Balkan	9	11	-2	8	15	-7	10	14	-5	*+12.6*	*+33.7*
Cheese											
EU15	7256	7050	206	8015	7705	309	8261	7976	285	*+13.8*	*+13.1*
EU10	931	823	108	1113	999	114	1236	1003	233	*+32.8*	*+22.0*
EU02	144	129	14	146	183	-37	130	194	-63	*-9.5*	*+49.6*
EU27	8331	8002	329	9273	8887	387	9627	9173	454	*+15.6*	*+14.6*
Western Balkan	56	85	-30	74	122	-48	88	131	-43	*+58.9*	*+53.1*
Fresh milk products											
EU15	39920	40268	-347	40806	41659	-853	40346	41202	-856	*+1.1*	*+2.3*
EU10	6986	6905	82	8062	7237	825	7648	6939	709	*+9.5*	*+0.5*
EU02	481	483	-3	499	500	-1	518	499	19	*+7.7*	*+3.2*
EU27	47388	47656	-268	49368	49397	-29	48512	48640	-128	*+2.4*	*+2.1*
Western Balkan	982	1014	-32	1381	1346	35	1654	1463	192	*+68.5*	*+44.3*
Cream											
EU15	1944	1863	81	2124	1993	131	2150	2013	137	*+10.6*	*+8.1*
EU10	405	384	21	475	431	44	455	409	46	*+12.3*	*+6.5*
EU02	27	28	-1	37	35	2	30	30	0	*+11.6*	*+6.9*
EU27	2376	2275	101	2635	2459	177	2635	2452	183	*+10.9*	*+7.8*
Western Balkan	38	39	-2	53	52	1	62	54	8	*+64.2*	*+37.8*

Intervention products 'Butter' and skimmed milk products are expected to further decline in the EU-27 demand (-3.6% and -5.4%), but production would shift even faster away from these bulk products such that the EU-27 would turn from a net exporter to a net importer (Table 9). This change in net trade is even more sizeable for 'Whole milk powder' due to a continuous growth in demand combined with strongly declining production. If production is shifting away from these industrial products, some other dairy outputs have to expand strongly and in the EU-27 this is mainly 'Cheese', except in the EU-02, and also cream whereas production of fresh milk products is nearly stable. Fresh milk products would see a quite dynamic evolution in the Western Balkans. Fresh milk products are also the most important outputs among all dairy products at present in this region. Powder and 'Butter' supply and demand are also expected to grow on the Western Balkans, but starting from very low levels. Meat markets relate to cow and dairy markets (Table 10).

Table 10: Market developments in the reference run: Meat [1000 t]

	2004			2014			2020			2004 to 2020 [%]	
	Production	Demand	Net trade	Production	Demand	Net trade	Production	Demand	Net trade	Production	Demand
Beef											
EU15	7623	7388	235	7007	7457	-450	6682	7262	-580	*-12.3*	*-1.7*
EU10	699	612	87	663	633	30	613	586	27	*-12.3*	*-4.3*
EU02	260	281	-21	235	297	-61	223	287	-64	*-14.1*	*+2.0*
EU27	8581	8281	300	7906	8387	-481	7518	8135	-617	*-12.4*	*-1.8*
Western Balkan	246	325	-79	276	371	-95	296	380	-84	*+20.4*	*+16.8*
Pork											
EU15	17920	16188	1731	18966	16801	2166	19485	17091	2394	*+8.7*	*+5.6*
EU10	3367	3316	51	3461	3527	-66	3533	3572	-39	*+4.9*	*+7.7*
EU02	606	743	-137	612	920	-309	620	961	-341	*+2.3*	*+29.4*
EU27	21893	20247	1646	23039	21248	1791	23639	21624	2014	*+8.0*	*+6.8*
Western Balkan	522	606	-84	587	663	-76	631	696	-65	*+20.8*	*+14.9*
Poultry meat											
EU15	8891	8453	438	9919	9435	484	10379	9696	682	*+16.7*	*+14.7*
EU10	1779	1662	117	2055	1940	115	2162	1967	194	*+21.5*	*+18.3*
EU02	355	489	-133	374	650	-276	387	710	-323	*+8.9*	*+45.4*
EU27	11026	10605	421	12347	12024	323	12927	12374	553	*+17.2*	*+16.7*
Western Balkan	184	283	-99	232	345	-113	259	362	-103	*+40.9*	*+27.8*
Sheep/goat meat											
EU15	1030	1294	-264	1004	1389	-385	990	1412	-422	*-3.9*	*+9.1*
EU10	33	23	10	35	28	7	33	30	3	*+1.1*	*+29.0*
EU02	145	107	38	156	122	33	160	124	35	*+10.1*	*+16.2*
EU27	1208	1425	-216	1194	1539	-345	1183	1567	-384	*-2.1*	*+10.0*
Western Balkan	69	69	-1	77	79	-1	81	78	3	*+18.2*	*+11.9*

Demand growth is strongest for poultry in all regions, followed by 'Sheep and goat meat', 'Pork', and finally 'Beef' which is expected to face a declining demand. On the Western Balkans it appears that the sheep and goat sector is the least dynamic, even though demand and supply growth are still higher than expected for the EU-15. Production is shifting away from 'Beef' and sheep towards poultry and, somewhat less, towards 'Pork'. Within the EU-27, EU-02 is expected to develop increasing hunger for net imports, partly absorbing the additional net exports from the EU-15 of 'Pork' and 'Poultry meat'.

In the crop sector all crops are tied together through the area balance requiring that some crop areas increase if some other area declines (and total area does not change in equal amount). As a consequence we will investigate a few area aggregates that add up to total land in the following figures. Furthermore due to the key importance of the area allocation for agriculture these results shall be shown for each MS (Figure 6). Total agricultural area is declining over the projection horizon 2004-2020 in the EU-15 by 5% on average with the strongest decline expected for Ireland (-7.7%) and the smallest for Greece (-1.6%). Availability of land for (productive) agriculture also depends on the development of fallow land and set-aside, but this is quite stable except in Portugal. Overall the area allocation may be seen to be quite diverse in the EU-15 even at this level of crop aggregates. At the same time it is fairly stable. The clearest tendency apart from the downward trend in total area appears to be the decline in 'Fodder' area (-6%) but in relative terms, 'Cereals' (-7%), 'Oilseeds & pulses' (-8%) and 'Other arable crops' (-9%) are declining faster[24].

[24] The impacts of the biofuels directive may have been underestimated in this reference run against recent developments on agricultural markets. But EU Commission (2008c) also gives a (far smaller) decline of cereal area in the EU-15 between 2004 and 2014.

Heterogeneity is also characterising the land use in the EU-12 (Figure 7). Compared to the EU-15 we may also recognise a general tendency of total agricultural area to decline. A decline in 'Fodder' area also applies to the aggregate but it is more diverse than in the EU-15 ranging from stability in the Czech Republic to a strong decline in Latvia. In contrast to the EU-15 set-aside (and fallow land) area may be seen to increase because under the current legislation, set-aside would be introduced at the latest when payments attain 100% of standard EU payments. The reference run therefore does not reflect the Commission's proposal of an abolition of set-aside in the context of the CAP HC. 'Other arable crops' are declining fastest in the NMS (-21%) whereas Cereals and perennials follow (-9%) after 'Fodder' area (-15%).

Finally Figure 8 permits a summary comparison of EU regional aggregates and a detailed look at the Western Balkan countries. Total area in the Western Balkan countries is projected, conservatively, to remain largely constant. This is both a consequence of shorter time series for the trend estimation as well due to the fact that total area changes have been indeed very small in the past. 'Fodder' area is slightly increasing (+1%) and it is cereal area which is frequently declining (on average -7%). It may be recalled from Table 10 that meat production is markedly increasing in the reference run and the number of cows is also growing. These aspects partly explain the differences in long run trends of 'Fodder' areas between the Western Balkans and the EU-27.

Area changes and yield changes determine the change in supply on markets for crop products. As the corresponding output of crop aggregates (say fruits, olives, and wine) could only be aggregated on a monetary basis, crop markets shall be investigated at the example of important single crops (or homogeneous crop aggregates) where physical units appear to be useful (Table 11). The decline in cereal areas (-7% in the EU-15 to -10% in the EU-02) explains (approximately[25]) why production growth is always smaller than the increase in yields. Demand is growing stronger than production in the EU-15, reducing net exports, whereas the EU-02 would sizably reduce (feed) demand for Cereals, thus compensating the decrease in net exports from the EU-15 to a large extent. Declining feed demand for Cereals is related to modest growth in 'Pork' and poultry production, dominated by increases in feed efficiency over time and an increase in 'Fodder' production and demand on the whole Balkans (declining in the EU-25) reducing demand for other feed items such as Cereals.

[25] Whereas logarithmic changes would add up exactly (Δ(ln(production)) = Δ(ln(yield))+Δ(ln(area)), this does not hold exactly for conventionally calculated percentage changes: (X(t)-X(t-1))/X(t-1) ~ ln(X(t)-ln(X(t-1)).

Figure 6: Area developments in the reference run: EU-15 [Index relative to total agricultural area in 2004]

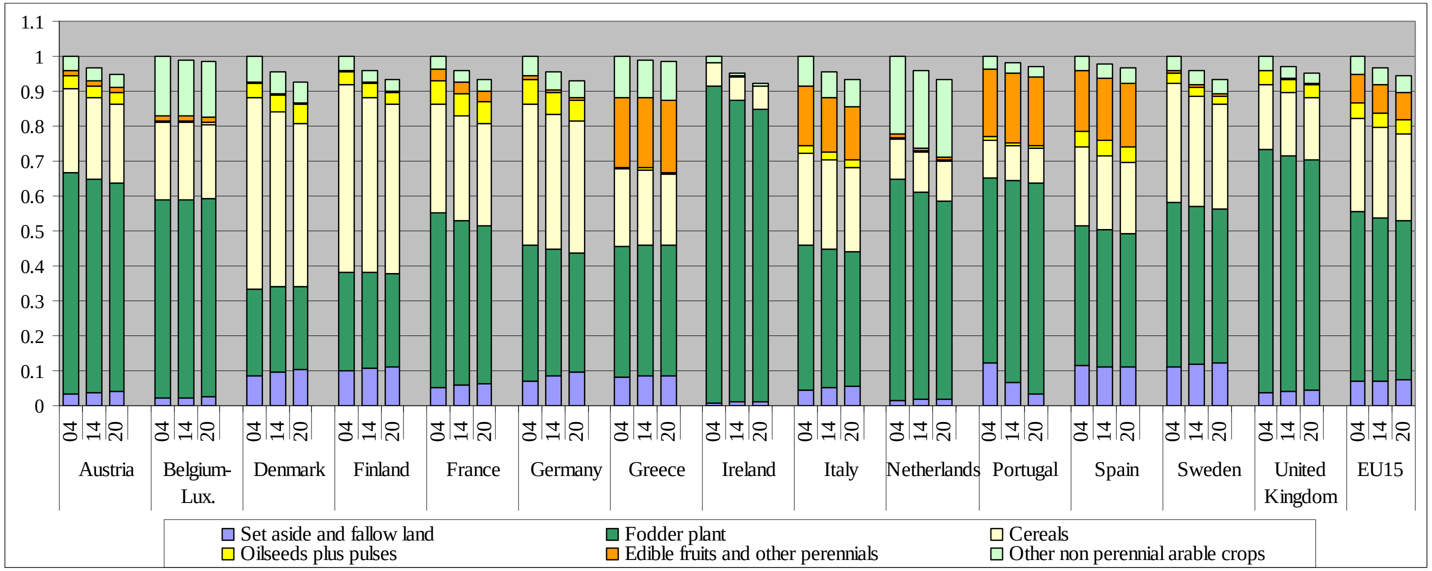


Figure 7: Area developments in the reference run: EU-12 [Index relative to total agricultural area in 2004]

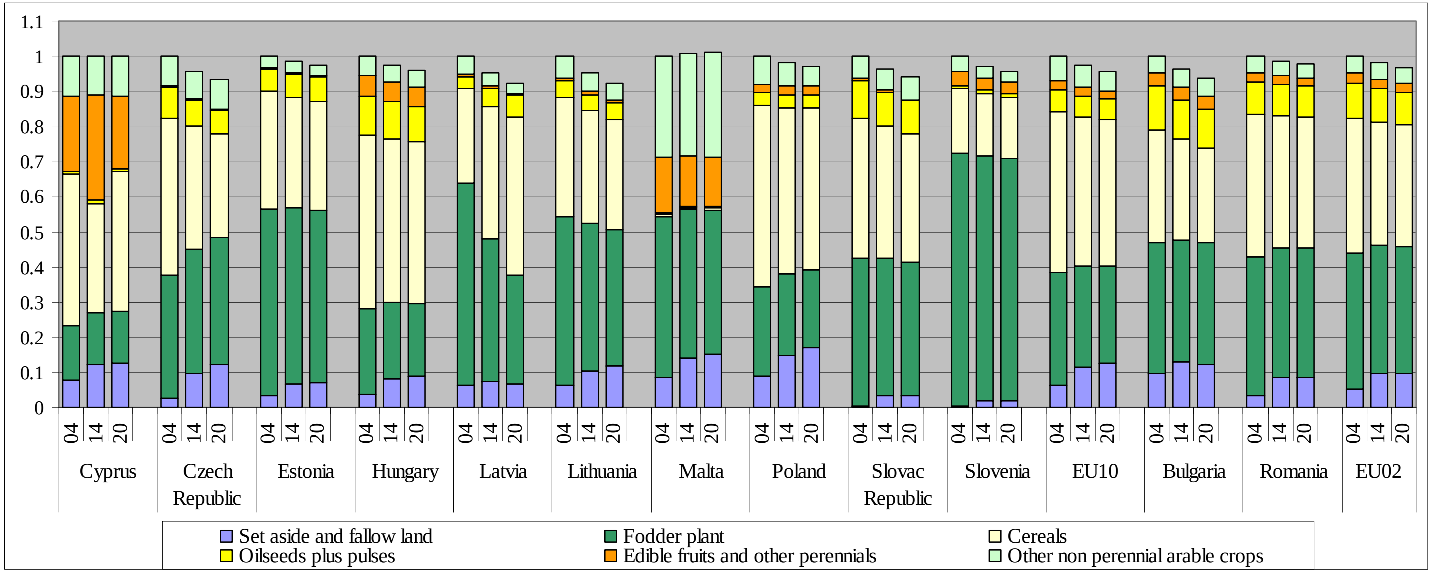


Figure 8: Area developments in the reference run: EU aggregates and Western Balkans [Index relative to total agricultural area in 2004]

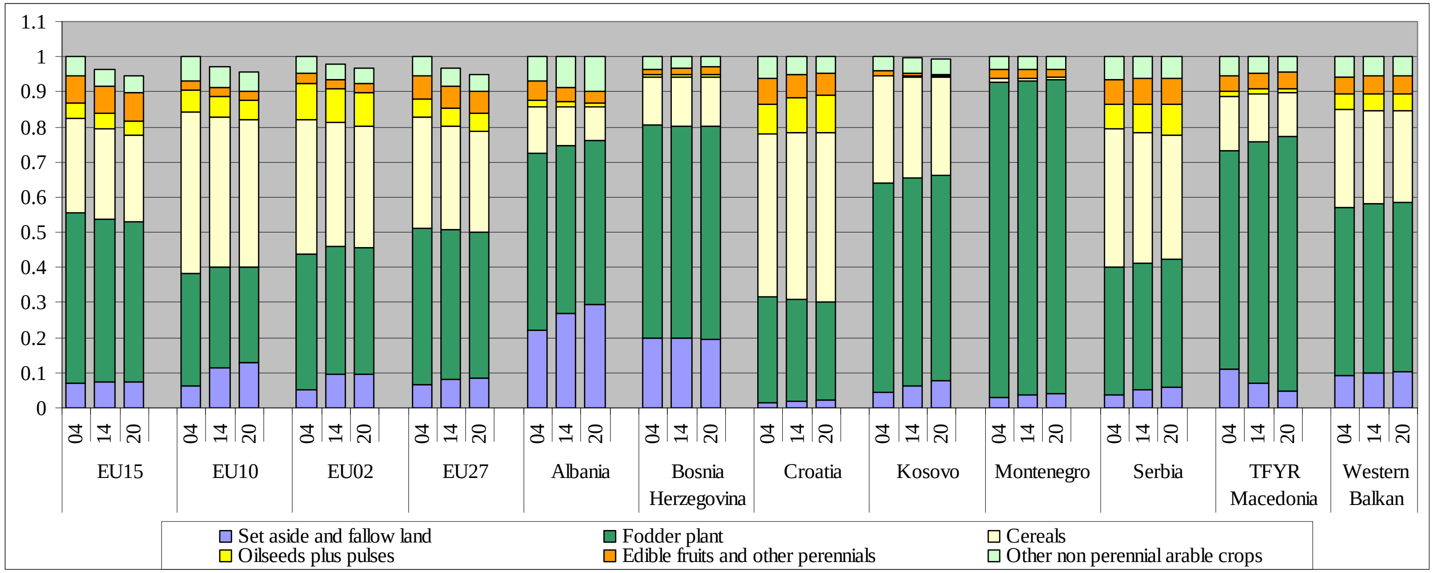


Table 11: Market developments in the reference run: Crops [1000 t]

	2004				2014				2020				2004 to 2020		
	Yield	Production	Demand	Net trade	Yield	Production	Demand	Net trade	Yield	Production	Demand	Net trade	Yield	Production	Demand
Cereals															
EU15	5670	207224	194232	12992	5972	208802	200014	8788	6153	208693	204257	4436	*+8.5%*	*+0.7%*	*+5.2%*
EU10	3881	59699	54576	5123	4109	58633	52163	6470	4235	59145	52938	6207	*+9.1%*	*-0.9%*	*-3.0%*
EU02	3416	25851	25403	448	3742	26004	22271	3733	3939	26855	21170	5685	*+15.3%*	*+3.9%*	*-16.7%*
EU27	4921	292773	274211	18563	5223	293438	274448	18991	5387	294693	278364	16328	*+9.5%*	*+0.7%*	*+1.5%*
Western Balkan	4344	14605	15758	-1154	4804	15465	16727	-1262	5086	15845	17202	-1357	*+17.1%*	*+8.5%*	*+9.2%*
Oilseeds															
EU15	2802	14417	32444	-18028	2916	15056	33405	-18349	2987	15190	34197	-19007	*+6.6%*	*+5.4%*	*+5.4%*
EU10	2349	4273	3107	1166	2596	4607	3226	1381	2745	4841	3316	1525	*+16.8%*	*+13.3%*	*+6.7%*
EU02	1497	2799	2138	661	1687	2955	1786	1169	1801	3195	1666	1528	*+20.3%*	*+14.2%*	*-22.0%*
EU27	2392	21489	37690	-16201	2559	22619	38417	-15799	2646	23226	39180	-15954	*+10.6%*	*+8.1%*	*+4.0%*
Western Balkan	2106	914	968	-54	2295	1140	1153	-14	2409	1289	1267	21	*+14.4%*	*+41.0%*	*+31.0%*
Potatoes & veget.															
EU15	34196	100811	100601	209	37168	102581	103335	-754	38868	102930	104202	-1272	*+13.7%*	*+2.1%*	*+3.6%*
EU10	19532	25159	25003	157	22189	24626	24055	571	23735	21575	22230	-655	*+21.5%*	*-14.2%*	*-11.1%*
EU02	17327	11245	11718	-473	19497	11769	12835	-1066	20758	12127	12988	-861	*+19.8%*	*+7.8%*	*+10.8%*
EU27	28088	137215	137322	-107	31068	138976	140226	-1250	32992	136633	139420	-2788	*+17.5%*	*-0.4%*	*+1.5%*
Western Balkan	11443	5293	5344	-51	12474	5491	5599	-108	13083	5606	5557	48	*+14.3%*	*+5.9%*	*+4.0%*
Fruits															
EU15	10897	34676	45003	-10327	11898	35835	47083	-11248	12423	36440	48298	-11859	*+14.0%*	*+5.1%*	*+7.3%*
EU10	7103	5207	5991	-784	7753	5494	6475	-981	8175	5628	6593	-965	*+15.1%*	*+8.1%*	*+10.0%*
EU02	8249	2400	2621	-220	10320	2738	2969	-231	11461	2887	3119	-232	*+38.9%*	*+20.3%*	*+19.0%*
EU27	10052	42283	53614	-11331	11056	44067	56527	-12459	11606	44954	58010	-13055	*+15.5%*	*+6.3%*	*+8.2%*
Western Balkan	4611	2188	2525	-338	4868	2413	2767	-355	5029	2569	2902	-333	*+9.1%*	*+17.4%*	*+14.9%*
Fodder															
EU15	21197	1396794	1396794	0	21601	1369656	1369565	92	21809	1346978	1346980	-3	*+2.9%*	*-3.6%*	*-3.6%*
EU10	15302	164863	164863	0	16781	162528	162570	-42	17602	161848	161855	-7	*+15.0%*	*-1.8%*	*-1.8%*
EU02	11191	85962	85962	0	11945	86183	86235	-52	12382	88501	88495	6	*+10.6%*	*+3.0%*	*+2.9%*
EU27	19533	1647619	1647619	0	20152	1618368	1618369	-1	20451	1597327	1597330	-3	*+4.7%*	*-3.1%*	*-3.1%*
Western Balkan	9643	55747	55747	0	10664	61928	61927	1	11249	65523	65520	3	*+16.6%*	*+17.5%*	*+17.5%*

'Oilseeds' area is moderately declining in the EU-27 and strongly increasing in the Western Balkans, most importantly in Serbia (Figure 8). Hence production growth is larger than yield growth in the latter region and conversely otherwise. Demand is growing equally fast as supply in the EU-15 but net imports are increasing nonetheless because demand is more than twice the domestic supply in the EU-15. Again this is nearly compensated by increasing net exports from the EU-10 as well as from the EU-02 (Table 11).

Declining areas are also typical for 'Other arable crops', from Figure 6 to Figure 8, which are mainly potatoes and vegetables. Hence production growth is again smaller than the growth of yields, in particular in the NMS (see above), continuing historical trends. Yield growth is typically higher in the NMS or on the Balkans, at least in relative terms. However, when items are quite aggregate in nature, such as in this case, changes in composition may increase or decrease yield growth which could explain why yield growth is quite similar in the EU-15 and on the Western Balkans. Demand is frequently growing at a similar pace as supply reflecting the fact that transport costs are quite high such that net trade is typically much smaller than supply or demand and changing only moderately. Nonetheless the EU-27 net imports could grow by up to 2.7 million tons of additional net imports because all larger sub-regions of the EU-27 are sharing the same tendency.

The picture is similar for 'Fruits', but the decline in areas is mostly smaller than for potatoes and vegetables such that production is growing by 6.3% whereas total production of potatoes and vegetables is expected to decline in the EU-27 (-0.4%). High yield growth in the EU-02 may be traced to apples and other fruits (except table grapes) in Romania which have increased strongly, while areas were declining in our database, giving similar trend estimates for the future. Net imports of 'Fruits' are increasing in spite of the growth in production because the growth of demand for 'Fruits' is even stronger (+6.3% in EU-27). This is different on the Western Balkans as the fruit area is likely to strongly expand, particularly in Serbia.

'Fodder' is taken to be nearly non-tradable such that net trade is relatively small and changing only to a small extent such that relative changes of production are nearly equal to those of supply. Apart from the EU-02 the Western Balkans is the only region with an increasing supply and demand of 'Fodder' which is related to a sizeable increase in meat and cow milk production (see Table 7 and Table 9).

Having discussed price and quantity changes for the most important crop and animal products, income changes follow basically from combining both and adding the changes on the input side. Supplementing changes in total income with changes in the labour force permits calculating changes in income per labour unit (Table 12).

The difference of total output and total input in Table 12 is gross value added (GVA, at EAA basic prices, i.e. including allocatable subsidies and taxes). It may be seen that more than half of total input is no-feed input. The prices of this important cost category are assumed to follow general inflation which is typically around 40% from 2004 to 2020, depending on the country. Non agricultural prices are thus increasing clearly faster than the agricultural prices with the strongest price increases (about 30% for 'Wheat', 'Rice' and 'potatoes and vegetables', see Table 6). Unless productivity is increasing rapidly, this fact will exert some downward pressure on GVA. Depreciation has been assumed to remain constant such that factor income is basically GVA less some constant amount[26]. Factor income is indeed declining in the EU-27 agriculture from 2004 to 2020 on average by about 10%. The EU-12 is in general coming out more favourably than the EU-15 countries with both yield gains and increases in premiums being higher in the EU-12. In some countries this is furthermore relying on shaky trends for the denominator of per capita income.

In the Western Balkans factor income is increasing stronger (+16.7%). Differences between countries are large and with highest changes in Denmark (-48.4%), Latvia (+38.2%), and Albania (+61%). The reasons for this heterogeneity are differences in production structures, in productivity gains, and (much less) in national price developments. The percentage decline in income is high in Denmark due to a high share of depreciation in GVA and, thus, low initial factor income. In Latvia and Albania expansions of profitable crop areas (Cereals and industrial crops) make important contributions to sectoral income gains (Figure 7 and Figure 8). The remarkable decline in factor income in Croatia is due to below average yield growth in the whole crop sector (even though initial yields compare favourably to the EU-12, for example). Factor income per head is strongly influenced by projected labour use.

[26] Factor income = GVA - depreciation - 'other taxes' + 'other subsidies'. The difference of 'other taxes' and subsidies that are not included in basic prices is usually very small.

Table 12: Income changes and factor income per AWU in the reference run

	2004						2014 [% to 2004]						2020 [% to 2004]					
	Total output	Total input	Nofeed input	Factor income	Agric. labour	Factor inc. / head	Total output	Total input	Nofeed input	Factor income	Agric. labour	Factor inc. / head	Total output	Total input	Nofeed input	Factor income	Agric. labour	Factor inc. / head
	[m €]	[m €]	[m €]	[m €]	[1000 AWU]	[€ / AWU]	[m €]	[m €]	[m €]	[% to REF]	[% to REF]	[% to REF]	[m €]	[m €]	[m €]	[% to REF]	[% to REF]	[% to REF]
Austria	5703	3100	1981	2429	168	14489	2.4	17.9	23.4	-17.2	-14.7	-3.0	6.3	32.3	36.8	-26.5	-20.3	-7.8
Belgium-Lux.	7076	4525	2405	2216	76	29320	5.9	15.5	24.8	-12.8	-9.2	-4.0	10.5	26.4	39.4	-20.3	-10.6	-10.9
Denmark	8084	5185	2632	2007	67	30131	0.5	13.5	25.4	-33.0	-30.2	-4.0	3.3	23.9	40.3	-48.4	-42.8	-9.8
Finland	3972	2618	1522	1790	102	17551	0.7	12.1	25.5	-16.0	-33.3	25.9	1.9	20.0	40.7	-25.0	-46.8	41.0
France	63357	34372	22473	21432	956	22426	1.4	16.6	23.4	-22.7	-19.2	-4.2	4.6	27.9	36.7	-31.3	-27.8	-4.8
Germany	40907	25529	15473	10975	595	18446	3.0	11.4	18.5	-15.1	-34.1	29.0	7.9	21.5	29.9	-20.5	-52.6	67.9
Greece	12147	3864	2505	8607	613	14031	5.0	15.7	27.4	-0.1	-7.1	7.6	11.1	34.7	43.5	0.1	-10.4	11.6
Ireland	5972	3482	1920	2828	160	17678	-1.7	10.1	23.4	-15.9	-12.9	-3.5	4.6	28.2	36.8	-25.0	-12.7	-14.2
Italy	45700	18176	11243	20383	1259	16190	3.3	16.8	28.4	-7.5	-18.9	14.1	7.0	31.5	45.0	-12.5	-24.6	16.2
Netherlands	20731	12290	8826	5869	201	29167	11.1	20.3	29.4	-3.2	-25.5	30.0	19.3	34.0	47.4	-3.1	-41.2	64.8
Portugal	6708	3920	2379	2567	452	5684	4.7	18.0	28.1	-15.2	-30.8	22.6	8.6	31.4	45.0	-25.4	-41.8	28.1
Spain	42047	15436	8454	25433	1024.0	24836	10.8	29.5	47.0	0.0	-13.4	15.5	18.0	51.4	78.5	-1.5	-15.2	16.2
Sweden	4646	3165	2291	1320	75	17707	-0.4	10.3	18.0	-26.1	-9.2	-18.6	3.6	20.7	29.2	-36.9	-12.6	-27.9
United Kingdom	24316	14207	10653	9192	300	30634	4.8	3.4	5.0	7.5	-23.4	40.3	10.3	9.4	8.2	12.6	-35.7	75.3
Cyprus	615	270	132	331	23	14636	10.3	17.3	30.1	5.0	-36.5	65.3	13.5	32.1	49.3	-1.1	-54.9	119.2
Czech Republic	3443	2313	1308	990	162	6117	17.8	15.8	22.0	25.1	-29.8	78.1	17.3	23.2	31.2	5.9	-38.0	70.9
Estonia	474	284	122	190	38	4956	18.2	20.6	32.1	14.7	-15.8	36.2	23.7	35.7	52.7	5.9	-19.9	32.2
Hungary	6129	3818	2503	2013	553	3639	14.4	23.9	32.7	-1.5	-42.4	70.9	19.7	39.8	52.2	-15.7	-58.8	104.6
Latvia	674	413	265	323	140	2312	28.6	20.9	27.4	33.1	-19.3	64.9	39.6	34.9	44.4	38.2	-30.5	98.8
Lithuania	1405	892	524	430	167	2572	25.9	21.1	28.8	40.9	-40.5	136.5	30.4	33.7	45.9	29.5	-42.1	123.7
Malta	126	65	36	64	4	15073	3.8	20.6	26.4	-13.4	-17.7	5.3	5.4	31.7	42.1	-21.6	-24.2	3.5
Poland	13657	8277	4918	4598	2285	2012	28.5	33.3	39.3	24.8	-3.4	29.1	34.0	54.3	64.0	3.4	-4.8	8.6
Slovac Republic	1726	1250	926	396	108	3684	19.8	24.3	27.2	9.4	-52.8	131.7	24.1	38.7	42.6	-17.1	-70.0	175.8
Slovenia	1040	587	265	351	92	3818	5.6	11.4	23.1	-2.5	-19.1	20.4	4.7	21.0	36.2	-21.2	-26.9	7.8
Bulgaria	3658	1813	1376	1815	710	2555	21.8	16.1	18.3	27.8	-55.6	187.5	22.3	20.6	26.7	24.4	-76.4	426.9
Romania	12113	5785	3043	5423	2543	2133	23.2	23.9	38.4	26.3	-20.3	58.5	30.1	35.7	61.0	29.1	-25.1	72.3
EU27	334474	174018	108973	133636	12871	10383	7.5	18.1	26.6	-4.8	-20.5	19.7	12.4	31.2	42.0	-9.6	-27.6	24.7
Albania	2387	1120	698	1083	542	1998	49.3	63.8	88.7	42.8	-13.7	65.4	83.8	119.6	155.7	61.0	-21.0	103.8
Bosnia Herzegovina	942	444	181	428	167	2561	16.6	22.2	48.6	13.5	-13.0	30.5	32.4	44.9	82.1	24.7	-20.0	55.9
Croatia	1925	801	466	997	232	4308	-3.5	26.5	33.9	-28.0	-20.0	-10.0	4.8	46.4	55.1	-27.9	-30.0	2.9
Kosovo	380	180	102	172	70	2458	16.4	31.0	43.7	3.9	-16.4	24.2	30.5	56.4	72.6	8.6	-24.9	44.6
Montenegro	324	151	88	149	20	7290	19.9	47.4	53.3	-4.7	-11.8	8.0	37.0	85.6	89.9	-6.2	-18.1	14.5
Serbia	3795	1735	942	1781	580	3069	9.8	25.9	36.7	-4.3	-14.4	11.8	19.2	44.2	59.8	-2.1	-22.0	25.5
TFYR Macedonia	920	487	323	366	101	3627	7.5	21.9	29.7	-10.3	-9.6	-0.7	11.9	36.9	47.8	-19.2	-15.0	-5.0
Western Balkan	10309	4874	3057	4594	1712	2720	21.3	35.9	37.3	11.1	-14.6	28.3	37.2	64.2	68.9	16.7	-22.2	48.0

4 EU DAIRY REFORM SCENARIOS

4.1 DEFINITION OF DAIRY REFORM SCENARIOS

On 20 November, 2007 the EU Commission published its Communication to the Council and to the EU Parliament and on the preparation of a HC for the CAP (EU Commission, 2007b) which includes among other proposals a special section on dairy. The Communication confirmed that the milk quota system will not be continued after the expiry in 2015 and that this step should be prepared through an earlier soft landing policy[27]. This soft landing policy involves further gradual quota increases of 1% per year in each of the years 2009-2013, summing up to a total increase of 5% according to the legislative proposals (EU Commission, 2008d).

The following dairy reform scenarios are performed:

- quota expiry scenario (EXPIRY, year 2020): the year 2020, 5 years after the scheduled expiry in 2015, corresponds to the magnitude of medium run elasticities (about 0.3 for milk) and it is comparable with the long run EDIM 2008 results given for 2020 as well;
- a part of the Commission's quota expiry strategy[28] is a soft landing policy involving a series of quota expansion steps. The situation after the last of these steps will be simulated as well (EXPIRY-SOFT, year 2014) and may be compared with the reference run results given for the same year;
- early quota expiry scenario in 2009 (EXPIRY-FAST, simulation year 2014): to identify the impact of soft landing relative to early full quota expiry we will also simulate quota expiry results for 2014 which would follow from a hypothetical expiry some years earlier (in 2009). This is not politically relevant but may be interesting for a technical analysis and understanding of CAPSIM results.

For the more relevant 2020 simulations sensitivity analyses on different quota rent assumptions and on an export subsidy abolition are performed providing several variants in terms of quota rent assumptions and export subsidy abolition.

Sensitivity on different quota rent assumptions[29]:

- reference run with increased quota rents, export subsidies still in place ('REF-HIGH');

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[27] A proposal that cannot be captured in CAPSIM, is the specific help for mountainous regions through specific measures using a revised Article 69 of regulation 1782/2003.

[28] It should be noted that the long run results for 2020 from a comparative static model such as CAPSIM would be the same with or without such preparation. The short-run effects of soft landing as compared to a 'big bang' quota abolition in 2015 without preparation cannot be analysed with comparative static models.

[29] A corresponding sensitivity analysis for the impacts of higher quota rents is also prepared for the base year 2004.

- expiry with increased quota rents, export subsidies still in place ('EXPIRY-HIGH').

Sensitivity on export subsidy abolition:

- reference run with default quota rents, export subsidies still in place (REF);
- expiry with default quota rents, export subsidies still in place (EXPIRY);
- reference run with default quota rents, export subsidies abolished (REF-NOSUB);
- expiry with default quota rents, export subsidies abolished (EXPIRY-NOSUB).

For the base year 2004 a sensitivity analysis is carried out to compare the intra EU price transmission steered by national net trade with a more traditional intra EU price linkage with fixed linkage to the EU level:

- expiry with default quota rents, export subsidies and default price linkage depending on net trade (EXPIRY);
- expiry with default quota rents, export subsidies and fixed price linkage to EU level (EXPIRY-FXLINK).

The counterfactual expiry is assumed to take place in 1999 that is five years before observing the effects. This corresponds to the interpretation of scenario EXPIRY-FAST for 2014 and EXPIRY for 2020.

For additional clarity the different EU dairy simulations are summarised in Table 13. This table also indicates counterfactual simulations carried out for the base year 2004 that may be considered as ex-post validation because unlike the pure calibration result, these results shed some light on the responsiveness of CAPSIM.

Table 13: Overview on CAPSIM EU dairy simulations performed in this study

Acronym	Milk quotas	Export subsidies	Initial rents	2004	2014	2020
EXPIRY	EC proposal	Active	Default	☒		☒
EXPIRY-FXLINK	EC proposal	Active	Default	☒		
EXPIRY-NOSUB	EC proposal	Abolished	Default	☒		☒
EXPIRY-HIGH	EC proposal	Active	High			☒
EXPIRY-FAST	Abolished 2009	Active	Default		☒	
EXPIRY-SOFT	EC proposal	Active	Default		☒	

Scenario EXPIRY-FXLINK is identical to EXPIRY in all aspects except for the price transmission (methodological sensitivity, see Section 4.1).

4.2 RESULTS OF DAIRY REFORM SCENARIOS

4.2.1 Dairy scenarios: 2004

This section deals with the dairy scenarios carried out for 2004. The counterfactual for 2004 (quota expiry in 1999, simulated for 2004) serves as a convenient starting point that is unaffected from the methodology to project the future market situation under status quo conditions. Results should be straightforward to explain therefore and may serve as a model response validation in an ex-post analysis.

Another aspect of this ex-post analysis is that quota rents may be assumed to be zero in EU-12 such that the main impacts would be on EU-15. It is useful therefore to focus on the EU-15 members and to show results for the EU-10 and the EU-02 only in aggregate form. This stronger focus will simplify the analysis, giving an introduction to subsequent sections on impact analyses for future years.

In terms of variables the emphasis will be on the market results as all income and welfare results are derived from it. The structure of the market result tables will be the same for all products selected: absolute numbers for the reference situation (REF) and then percentage changes to the REF at one digit[30]. Negative percentage changes exceeding 100% in absolute terms indicate that the trade position has changed from net exports (net trade > 0) to net imports (net trade < 0) or vice versa, whereas they are impossible for other variables.

Overall a counterfactual quota expiry in 2004 is expected to increase production in the EU-15 by 5.1%. The differences between MS are mainly due to the initial quota rent assumptions (Figure 9).

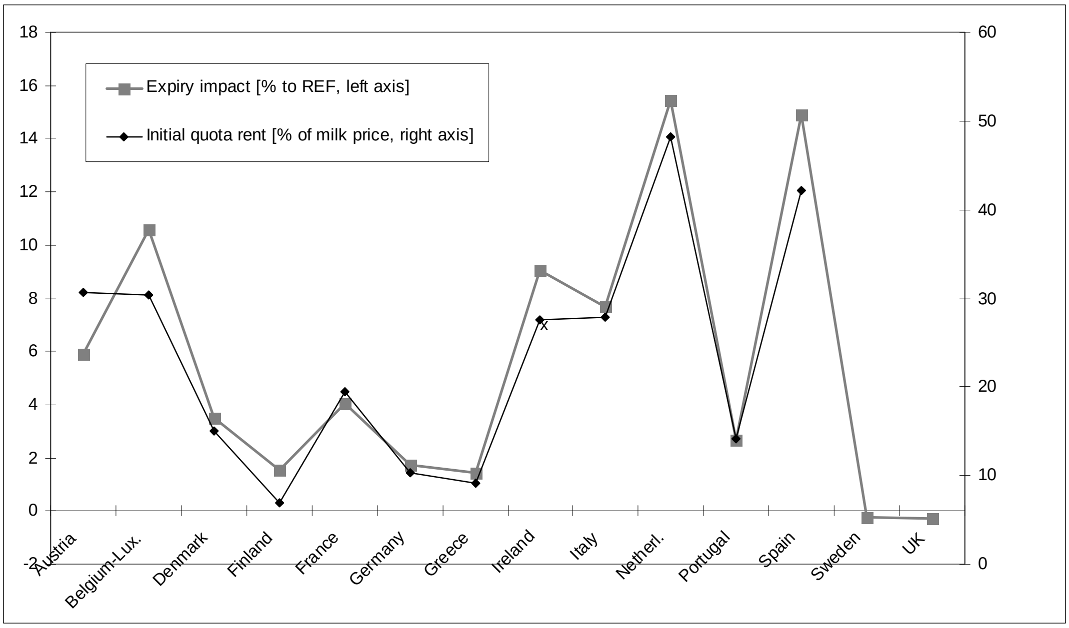
It may be seen that the countries with the highest estimated quota rents (The Netherlands, Spain, see right axis) would have also seen the strongest increase in their milk production (about 15%, see left axis), whereas countries with zero quota rents (Sweden, UK) would have reduced their milk production, had the quota system been abolished before 2004 because milk prices would be lower (Table 14). The two lines do not match exactly for several reasons. Supply elasticities are in general estimated around 0.3 but they are not all exactly equal. Furthermore milk, 'Fodder' and other prices are changing differently in MS of the EU-15. Nonetheless it is evident that the key driver for intra EU differences comes from the specified quota rents.

A rising milk production (+5.1%) causes milk prices to drop, on average by 5.0% in the EU-15 (Table 14), ranging from a low 0.6% in Sweden to almost 20% in Spain. The first information to explain these differences is that net trade for non-tradable items like raw milk is assumed to be fairly stable. It is usually a very small percentage of total production occurring only where established trade relations (say between Dutch and German dairies) imply low transactions costs and transport costs are also compatible with such cross border trade. The stability of net trade has been built into the intra EU price transmission function in such a way that raw milk prices would need to drop significantly to permit a small change in net trade (see Equation (18) and discussion). This almost fixes net trade to the observed value in the base year such that raw milk prices basically clear at the national level. Strong increases

[30] Because the absolute numbers given are rounded from the exact results it need not hold exactly in the tables that net trade = production minus demand.

in milk production, therefore, tend to be related to strong drops in producer prices. Producer prices have to decline as well to improve incentives for dairies to take up these additional quantities, as cost for other inputs will increase with an increased volume of processing. In other words: increasing marginal costs for other inputs leave a lower margin to pay farmers if deliveries are increasing (abstracting from non-competitive behaviour and incomplete capacity utilisation in dairies).

Figure 9: Counterfactual quota expiry impacts on cow milk production and initial quota rents in the base year 2004 (%)



The second contribution to explain heterogeneity in changes of raw milk prices is that prices of secondary milk products are also declining non-uniformly between MS. An above average decline in secondary milk products prices will also trigger an above average decline in raw milk prices which explains, for example, the above average impact of EXPIRY on producer prices in Spain (compare price effects in the following tables). It is expected that the price drop in MS of the EU-15 would spill over to the EU-10 whereas prices would slightly increase in the EU-02. The latter follows from a relatively strong increase in net imports.

In terms of the price effects the export subsidy abolition has a strong and rather additive effect: prices in the EU-15 decline by 11.8% under REF-NOSUB and by 17.5% under EXPIRY-NOSUB. The difference (17.5%-11.8% = 5.7%) is only slightly larger than the EXPIRY impact (5%) indicating that market management is indirectly supporting raw milk prices through an adjustment of export subsidies, but only to a very limited degree.

Scenario EXPIRY-FXLINK removes the dependency of national prices of tradable products on national net trade introduced in the revised intra EU price transmission of CAPSIM (by setting $\phi_{m,i,lo} = \phi_{m,i,up}$ in Equation (17)). The traditional price transmission used a fixed relative or absolute[31] differential between the EU level and national prices. In the revised specification

[31] If national base period prices were above the EU level an absolute margin has been used, to prevent changes of EU price being scaled up in an implausible way. Assuming that a certain EU price is 100 € and a national

national prices of dairy products decline relative to the EU market price, if national net exports increase. Subsequent tables will show that this triggers an above average drop of dairy prices in MS with a strong growth of supply in Austria, Belgium-Luxembourg, The Netherlands and Spain. This pressure on dairy prices translates into an additional drop of raw milk prices in scenario EXPIRY, as may be seen when comparing with the corresponding price change column for EXPIRY-FXLINK in Table 14. In line with more favourable product prices under EXPIRY-FXLINK the increase of raw milk production in the EU-15 is somewhat higher under EXPIRY-FXLINK than under EXPIRY.

The counterfactual quota expiry in 2004 would have increased the EU-15 'Butter' production by 8.1 %, and net exports to about 170000 t which corresponds to an increase of 783% given the small initial value in the base period (Table 15). 'Butter' prices would have decreased as well, but the percentage change is just 0.6% in the EU-15. The reason for this small price effect is that EU market management is assumed to effectively defend the historical relation of 'Butter' market prices and administrative prices with an endogenous increase of export subsidies (see Equation (15)) from 2489 €/t to 2600 €/t[32].

The differences in the price impacts between MS are much smaller than for raw milk because 'Butter' is well tradable. Nonetheless the revised price transmission specification implies that predicted price changes are not uniform anymore as they are (nearly) under EXPIRY-FXLINK. Spain is expected to see the strongest increase in net exports, but it would also be the country with the strongest decline in 'Butter' prices as national net trade (relative to the sum of supply and demand) is determining how national prices change relative to the EU price. Comparing the change in production under EXPIRY and EXPIRY-FXLINK confirms that supply growth is estimated smaller if an increase in national net trade decreases national prices relative to the EU price.

Regarding the effects of export subsidies on the 'Butter' market we see that they are stronger than the pure quota expiry effects, just as for raw milk. Furthermore the price drop in the EU-15 under EXPIRY-NOSUB relative to REF-NOSUB is clearly stronger than under the

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price of 200 € in the base year and that the EU price would increase by 50% in a simulation, with a relative differential (of 100%) this would imply an increase of the national price from 200 € to 300 € but only from 200 € to 250 € under an absolute differential of 50 €. However, absolute differentials that are negative (national prices smaller than the EU price in the base period) could possibly generate negative national prices if the EU price drops strongly. Hence CAPSIM used relative differentials if national prices were smaller than the EU price and absolute differentials, if national prices were larger than the EU price.

[32] Export subsidies in the reference run are also presented in Table 6. Where interesting, export subsidies in particular scenarios are given in the text, just like absolute amounts of net exports or any other useful information.

standard EXPIRY scenario (11.9 - 7.6 = 4.3% > 0.6%). The relevance of export subsidies in the base period also follows from the world price (1413 €/t being much smaller than the EU-27 market price (3549 €/t, see Table 6). If export subsidies prevent 'Butter' prices to drop severely they indirectly support the expansion of 'Butter' production which would have increased by 2.5% only without export subsidies as may be calculated from the difference of impacts under scenarios EXPIRY-NOSUB and REF-NOSUB (2.5% = 2.7%-0.2%).

Table 14: Market results for quota expiry related scenarios: Cow milk, 2004 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				EXPIRY-FXLINK				REF-NOSUB				EXPIRY-NOSUB			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	262	3216	3055	161	-8.9	5.9	6.2	0.2	-7.6	6.2	6.5	0.2	-10.7	0.0	0.0	-0.1	-20.2	4.1	4.3	0.2
Belgium-Lux.	262	3394	3459	-64	-7.9	10.6	10.4	-0.5	-7.4	10.8	10.5	-0.5	-15.9	0.0	0.0	-0.6	-24.2	5.7	5.6	-1.1
Denmark	308	4614	4629	-15	-3.1	3.5	3.5	0.7	-2.8	3.6	3.6	0.5	-15.2	0.0	0.0	-2.7	-19.6	-0.2	-0.2	-2.4
Finland	342	2468	2468	0	-2.0	1.5	1.5	-52.4	-1.7	1.6	1.6	-48.4	-9.3	0.0	0.0	-68.4	-12.1	-0.8	-0.8	-129.8
France	268	25347	24819	528	-5.0	4.0	4.1	0.1	-4.5	4.2	4.2	0.1	-14.2	0.0	0.0	0.3	-19.9	1.3	1.3	0.4
Germany	274	29728	29326	402	-2.3	1.7	1.8	-0.3	-2.1	1.8	1.8	-0.3	-12.3	0.0	0.0	0.1	-15.8	-0.8	-0.8	-0.1
Greece	313	796	837	-41	-3.6	1.4	1.4	0.0	-3.3	1.5	1.4	0.0	-13.0	0.0	0.0	-0.1	-16.3	-1.2	-1.1	0.0
Ireland	264	5297	5585	-289	-4.8	9.0	8.6	0.0	-4.6	9.1	8.7	0.0	-10.4	0.0	0.0	0.1	-16.5	5.2	5.0	0.0
Italy	332	11515	12732	-1217	-7.1	7.7	7.0	-0.1	-5.6	8.1	7.4	0.0	-9.3	0.0	0.0	0.1	-17.1	5.2	4.7	0.0
Netherlands	321	10911	11410	-499	-7.4	15.4	14.8	-0.2	-6.6	15.7	15.0	-0.2	-9.3	0.0	0.0	0.1	-18.1	13.0	12.4	-0.1
Portugal	286	2132	2113	20	-3.5	2.7	2.7	-0.1	-3.0	2.8	2.8	-0.1	-11.1	0.0	0.0	-0.2	-15.1	0.3	0.3	-0.4
Spain	278	6613	6562	51	-19.3	14.9	15.0	4.9	-17.3	15.9	16.0	4.3	-11.9	0.0	0.0	0.0	-28.5	10.6	10.6	4.4
Sweden	312	3219	3115	104	-0.6	-0.2	-0.2	-0.2	-0.6	-0.2	-0.2	-0.2	-11.8	0.0	0.0	0.0	-13.5	-2.6	-2.7	-0.2
United Kingdom	254	14685	14384	300	-0.8	-0.3	-0.3	-0.4	-0.8	-0.3	-0.3	-0.3	-10.5	0.0	0.0	-0.2	-12.0	-2.8	-2.9	-0.6
EU15	283	123935	124494	-559	-5.0	5.1	5.1	-0.5	-4.4	5.3	5.3	-0.4	-11.8	0.0	0.0	0.0	-17.5	2.3	2.3	-0.6
EU10	195	21341	21250	90	-0.4	-0.4	-0.4	-2.0	-0.5	-0.4	-0.4	-1.7	-13.4	0.0	0.0	1.1	-14.3	-2.5	-2.5	-1.3
EU02	202	6451	6454	-2	0.5	-0.5	-0.5	27.8	0.3	-0.6	-0.6	23.6	-7.3	0.0	0.0	29.2	-7.3	-1.3	-1.3	62.6
EU27	267	151727	152198	-471	-4.1	4.1	4.1	-0.1	-3.6	4.2	4.2	-0.1	-11.8	0.0	0.0	-0.1	-16.7	1.5	1.5	-0.2

Table 15: Market results for quota expiry related scenarios: Butter, 2004 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				EXPIRY-FXLINK				REF-NOSUB				EXPIRY-NOSUB			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	3765	32	41	-9	-0.7	13.5	0.0	-46.4	-0.2	14.9	0.0	-51.4	-8.1	-3.0	0.1	11.0	-12.7	4.6	0.2	-14.9
Belgium-Lux.	3130	117	107	10	-0.5	12.2	0.0	147.4	-0.2	12.5	0.0	150.5	-8.7	1.6	0.1	17.6	-13.5	8.1	0.2	96.1
Denmark	3852	102	87	15	-0.6	5.0	0.0	34.1	-0.1	5.6	0.0	38.3	-8.4	5.0	0.1	33.5	-12.6	4.8	0.1	32.2
Finland	3041	52	36	15	-0.3	2.4	0.0	8.2	-0.2	2.8	0.0	9.3	-8.6	-1.8	0.3	-6.9	-13.1	-3.2	0.4	-11.8
France	4591	414	476	-62	-0.6	7.8	0.1	-51.3	-0.1	8.6	0.0	-57.5	-6.9	4.6	1.1	-22.1	-10.6	7.4	1.8	-35.9
Germany	3463	439	523	-84	-0.4	4.4	0.1	-22.1	-0.2	4.4	0.0	-22.4	-8.5	-1.9	3.0	28.3	-12.9	-5.2	4.9	57.7
Greece	5468	2	9	-7	-0.1	2.7	0.0	-0.8	-0.1	2.6	0.0	-0.8	-5.6	-4.7	1.0	2.8	-8.5	-7.5	1.6	4.4
Ireland	3755	146	12	134	-0.2	11.2	0.0	12.3	-0.2	11.4	0.0	12.5	-8.2	2.8	0.3	3.0	-12.6	9.4	0.4	10.2
Italy	3705	123	167	-44	-0.6	11.5	0.1	-31.8	-0.2	12.4	0.0	-34.4	-8.2	-2.2	1.2	10.8	-12.8	4.8	2.0	-6.1
Netherlands	2933	198	103	95	-0.5	17.4	0.0	36.2	-0.2	17.1	0.0	35.7	-8.6	-2.4	0.3	-5.3	-13.5	11.7	0.4	23.9
Portugal	3907	25	17	8	-0.3	3.8	0.0	11.6	-0.1	3.9	0.0	12.0	-7.8	-3.4	0.8	-11.7	-11.9	-4.1	1.2	-15.0
Spain	2836	47	42	5	-1.3	20.5	0.3	191.6	-0.2	22.4	0.0	211.3	-8.1	-7.3	1.6	-83.0	-13.3	3.1	2.8	5.6
Sweden	3663	48	38	10	-0.2	0.2	0.0	0.8	-0.2	0.0	0.0	0.1	-8.2	-3.1	0.4	-16.9	-12.2	-9.3	0.7	-48.3
United Kingdom	2864	126	193	-67	-0.1	-0.3	0.0	0.7	-0.2	-0.1	0.0	0.4	-8.5	-1.4	2.2	8.9	-12.7	-8.5	3.5	26.3
EU15	3647	1873	1853	19	-0.6	8.1	0.1	783.0	-0.2	8.5	0.0	823.8	-7.6	0.2	1.6	-125.7	-11.9	2.7	2.5	15.8
EU10	2578	223	205	18	-0.1	-0.2	0.0	-2.6	-0.1	-0.5	0.0	-6.1	-8.1	-2.2	1.4	-42.9	-11.7	-10.5	2.2	-152.5
EU02	2490	14	16	-2	-0.1	-1.3	0.0	8.4	-0.2	-1.9	0.1	12.7	-8.0	-11.2	2.3	87.8	-12.0	-20.1	3.5	153.7
EU27	3526	2110	2074	35	-0.3	7.2	0.1	424.3	0.0	7.5	0.0	444.5	-7.6	-0.1	1.5	-96.1	-11.6	1.1	2.5	-80.1

A quota expiry in 2004 would have also increased the EU-15 production of 'Skimmed milk powder' by 11.6% (Table 16). All industrial products like 'Butter', 'Skimmed milk powder' (and 'Whole milk powder', whey powder, casein) show an increase exceeding the increase in raw milk availability (+5.1% under EXPIRY in EU-15) because raw milk (or milk fat and protein) is the dominating cost component of these products such that margins improve considerably. Net exports of 'Skimmed milk powder' increase sizeably (+92 000 t) whereas powder prices only decrease slightly (-0.7%) in the EU-15 (Table 16). Again the decline is strongest for Spain which had net imports of (8000 t/19000 t i.e.) more than 40% of demand which almost disappear under EXPIRY. Finland, on the contrary, has an even larger percentage change in net trade (+1325%), but relative to domestic supply and demand, this is still very small (increasing from 0.1/(24.7+24.6) = 0.2% to 1.7/(26.4+24.7) = 3.4% based on the exact results). This example illustrates once more the operation of the intra EU price transmission.

Export subsidies support EU market prices which would be 11.3% smaller under REF-NOSUB. Note that the price impact of EXPIRY-NOSUB would be only somewhat stronger than that of EXPIRY in the EU-15 (12.9 - 11.3 = 1.6% > 0.7%). With EU price changes being quite moderate even without export subsidies, countervailing action from market management would have been also moderate, increasing export subsidies from 755 €/t to 821 €/t.

'Cheese' production (see Table 17) is expected to increase on average in the EU-15 by 5% which is nearly the same as the increase in raw milk production and less than shown above for industrial products 'Butter' and 'Skimmed milk powder'. Whereas the share of raw milk (milk fat and protein) cost in product prices is typically 70-80% for the latter products it is only 30-60% for 'Cheese', depending on the country. Thus margins in 'Cheese' production improve with higher availability of raw milk but not as much as for industrial products. Increasing production in most competitive MS of the EU-15 may be seen to displace production in UK, Sweden and the EU-12 in all expiry scenarios. As before it turns out that the current price transmission yields higher price drops in these most competitive MS and, thus, somewhat lower production increases under EXPIRY than under EXPIRY-FXLINK. Demand growth is small given the small price changes such that net exports from the EU-15 would be nearly tripled (+364.000 t or +177%).

Price impacts on 'Cheese' markets are small again, but slightly stronger than those for 'Skimmed milk powder' under EXPIRY (-1% in EU-15). Export subsidies increase market prices by 5% as the comparison with REF-NOSUB shows. This is less than for 'Skimmed milk powder' as the percentage export subsidy for 'Cheese' (11%, see Table 6) is clearly smaller than for 'Skimmed milk powder' (39%). Nonetheless market management through export subsidies plays an important role to limit the price drop to the above mentioned 1%: The average subsidy is simulated to increase from 487 €/t to 828 €/t and the price drop would have been 2% rather than 1% as under EXPIRY without market management through export subsidies as may be calculated from scenarios EXPIRY-NOSUB and REF-NOSUB (2% = 7% - 5%).

Table 16: Market results for quota expiry related scenarios: Skimmed milk powder, 2004 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				EXPIRY-FXLINK				REF-NOSUB				EXPIRY-NOSUB			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	2101	7	3	4	-1.1	23.7	0.2	45.7	-0.1	22.4	0.1	43.4	-10.4	-16.5	1.4	-33.1	-12.6	-3.3	1.7	-8.0
Belgium-Lux.	1998	90	55	35	-0.7	19.1	-0.2	49.4	-0.2	19.5	-0.3	50.7	-12.1	4.0	4.0	3.9	-13.8	15.0	4.3	31.9
Denmark	2120	26	18	8	-0.5	7.5	3.3	16.9	-0.1	10.2	3.1	26.0	-11.1	3.6	7.6	-5.3	-12.5	5.0	8.3	-2.2
Finland	2103	25	25	0	-0.9	6.9	0.4	1324.6	-0.1	9.1	0.0	1842.2	-9.7	-13.1	4.5	-3538.9	-10.9	-14.1	4.6	-3778.3
France	1913	206	183	23	-1.2	11.1	-1.1	109.3	-0.2	15.4	-1.4	150.6	-11.8	-6.6	1.2	-69.2	-13.6	-3.0	0.5	-31.3
Germany	1986	262	135	127	-0.4	7.4	0.4	14.9	-0.2	7.7	0.4	15.5	-11.5	-14.3	3.5	-33.2	-12.9	-14.9	3.8	-34.8
Greece	2101	0	3	-3	-0.1	0.0	-0.7	-0.7	-0.1	0.0	-0.6	-0.6	-11.5	0.0	1.8	1.8	-12.8	0.0	1.0	1.1
Ireland	2102	71	30	42	-0.5	17.0	-0.8	29.8	-0.1	18.0	-1.0	31.5	-10.7	-18.8	6.2	-36.6	-12.3	-11.2	6.5	-23.9
Italy	2106	0	111	-111	-0.1	0.0	0.9	0.9	-0.1	0.0	0.9	0.9	-11.5	0.0	4.6	4.6	-12.8	0.0	5.7	5.7
Netherlands	2010	70	167	-97	-0.5	21.6	7.0	-3.5	-0.2	19.4	7.2	-1.6	-11.6	-16.1	3.2	17.0	-13.2	-2.0	9.3	17.4
Portugal	2101	8	12	-4	-0.8	12.5	1.5	-22.1	-0.1	13.1	1.2	-24.3	-10.7	-10.2	4.6	36.3	-12.1	-8.7	5.4	35.6
Spain	2081	11	19	-8	-3.5	75.1	0.8	-94.3	-0.1	83.9	-0.1	-107.6	-11.2	-6.6	3.3	16.1	-14.7	48.2	4.3	-51.9
Sweden	2098	32	32	0	-0.4	2.4	0.1	248.5	-0.1	3.5	0.1	364.2	-10.6	-6.4	3.1	-1030.1	-11.5	-10.9	3.2	-1516.2
United Kingdom	2192	91	87	3	-0.4	2.8	0.0	74.7	-0.1	3.9	-0.1	103.6	-9.6	-12.4	0.9	-345.6	-10.4	-16.0	1.0	-442.6
EU15	2016	896	878	19	-0.7	11.6	1.4	495.9	-0.2	13.0	1.3	567.1	-11.3	-10.1	3.1	-629.5	-12.9	-6.4	4.4	-512.4
EU10	1411	187	46	141	-0.1	1.7	0.1	2.2	-0.1	2.7	0.1	3.6	-12.6	-5.4	10.8	-10.8	-13.7	-14.1	12.0	-22.7
EU02	1702	13	19	-6	-0.1	0.6	0.6	0.7	-0.3	1.6	0.7	-1.3	-10.1	-13.2	1.8	35.3	-10.8	-18.8	2.1	48.7
EU27	1909	1097	944	153	-0.2	9.8	1.3	62.2	0.2	11.1	1.2	72.2	-11.7	-9.3	3.4	-87.7	-12.6	-7.8	4.7	-85.0

Table 17: Market results for quota expiry related scenarios: Cheese, 2004 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				EXPIRY-FXLINK				REF-NOSUB				EXPIRY-NOSUB			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	5169	145	159	-14	-1.4	6.3	0.2	-62.5	-0.6	7.0	0.1	-70.9	-4.5	-1.1	0.7	19.8	-6.7	1.9	1.1	-7.4
Belgium-Lux.	3188	60	208	-149	-0.6	5.6	0.2	-2.0	-0.6	4.3	0.2	-1.5	-5.4	16.0	1.4	-4.4	-7.5	18.6	2.0	-4.6
Denmark	4850	316	137	179	-0.6	1.8	0.1	3.2	-0.6	1.9	0.1	3.3	-5.2	3.0	0.7	4.7	-7.1	1.5	1.0	1.9
Finland	3799	101	97	4	-0.9	2.5	0.2	55.4	-0.6	2.4	0.2	54.3	-5.5	3.4	1.5	50.0	-7.4	2.3	2.0	8.3
France	5585	1811	1522	288	-0.6	1.8	0.2	10.2	-0.5	1.8	0.2	10.3	-4.2	-1.6	1.1	-16.4	-5.8	-2.6	1.6	-25.2
Germany	3660	1833	1754	80	-0.7	1.5	0.2	30.6	-0.6	1.4	0.1	29.3	-5.4	1.8	1.1	16.1	-7.2	-0.4	1.6	-42.4
Greece	6381	215	276	-60	-0.5	1.0	0.2	-2.6	-0.5	1.1	0.2	-3.1	-3.7	-0.7	1.0	7.2	-5.0	-1.9	1.5	13.3
Ireland	5670	116	39	77	-0.6	7.3	0.1	11.0	-0.5	7.6	0.1	11.4	-4.4	4.3	0.6	6.2	-6.2	7.9	0.9	11.6
Italy	5587	1118	1257	-139	-1.3	8.3	0.2	-65.3	-0.5	9.4	0.1	-74.8	-4.4	0.2	0.7	4.9	-6.6	5.6	1.1	-34.8
Netherlands	3863	689	358	331	-1.5	19.3	0.4	39.8	-0.6	20.7	0.2	42.9	-5.6	6.4	1.3	12.0	-8.3	23.8	2.1	47.2
Portugal	5160	80	104	-24	-0.8	3.9	0.2	-12.1	-0.6	4.0	0.2	-12.5	-5.1	5.2	1.4	-11.3	-7.0	6.4	1.9	-13.1
Spain	5159	321	418	-97	-1.9	18.6	0.5	-59.6	-0.6	20.0	0.2	-65.9	-4.9	2.6	1.1	-4.1	-7.6	15.1	1.8	-42.5
Sweden	4665	121	167	-46	-0.6	-0.3	0.1	1.1	-0.6	-0.8	0.1	2.7	-5.4	2.7	1.1	-3.2	-7.2	-1.3	1.5	8.9
United Kingdom	4720	330	555	-224	-0.6	-0.3	0.2	0.9	-0.6	-1.0	0.2	2.1	-5.2	1.5	1.4	1.3	-7.0	-2.5	2.0	8.6
EU15	4798	7256	7050	206	-1.0	5.2	0.2	176.5	-0.6	5.5	0.1	189.4	-5.0	1.3	1.1	8.8	-7.0	3.3	1.6	63.7
EU10	3442	931	823	108	-0.4	-0.5	0.4	-7.2	-0.6	-0.9	0.5	-11.8	-4.6	-0.1	3.6	-28.3	-5.9	-3.6	4.7	-67.1
EU02	3345	144	129	14	-0.4	-1.2	0.2	-14.0	-0.6	-1.9	0.3	-21.5	-5.0	-0.2	2.7	-25.9	-6.4	-4.1	3.5	-71.9
EU27	4621	8331	8002	329	-0.8	4.5	0.2	107.7	-0.4	4.7	0.2	113.9	-5.0	1.1	1.4	-4.9	-6.7	2.4	1.9	14.7

Table 18: Market results for quota expiry related scenarios: Fresh milk products, 2004 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				EXPIRY-FXLINK				REF-NOSUB				EXPIRY-NOSUB			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	656	897	743	154	-1.3	4.2	0.3	23.2	-0.6	4.8	0.1	27.1	-4.2	0.9	0.9	1.0	-6.2	5.5	1.4	25.4
Belgium-Lux.	641	1266	941	325	-0.9	2.6	0.2	9.4	-0.6	3.4	0.1	13.0	-4.4	2.2	0.9	6.0	-6.0	4.3	1.3	13.1
Denmark	779	715	719	-4	-0.5	-1.0	0.1	212.1	-0.5	-1.4	0.1	286.2	-3.5	0.4	0.7	55.8	-4.8	1.2	1.0	-41.1
Finland	747	969	958	11	-0.7	0.2	0.2	6.2	-0.5	0.4	0.1	21.0	-3.6	0.2	0.7	-53.1	-4.8	-0.3	1.0	-123.8
France	861	6051	5868	183	-0.5	-0.4	0.2	-18.9	-0.4	-0.6	0.2	-23.7	-3.2	1.1	1.0	3.9	-4.4	2.0	1.4	21.4
Germany	465	8833	7819	1014	-0.8	-0.2	0.2	-3.1	-0.6	0.1	0.2	-0.6	-4.7	4.1	1.0	28.2	-6.4	6.0	1.3	41.5
Greece	1029	707	789	-82	-0.4	-0.5	0.2	6.0	-0.4	-0.7	0.2	7.7	-2.6	0.3	0.9	6.1	-3.5	0.7	1.2	6.2
Ireland	850	619	769	-151	-0.4	-1.8	0.1	8.3	-0.4	-2.2	0.1	9.7	-3.0	-1.3	0.8	9.5	-4.2	-1.2	1.1	10.7
Italy	998	3437	4036	-599	-0.3	-1.9	0.1	11.7	-0.4	-3.7	0.1	21.9	-2.6	-1.3	0.6	11.3	-3.4	-2.3	0.8	18.8
Netherlands	759	1678	1997	-319	-0.5	-1.1	0.1	6.9	-0.5	-2.3	0.1	13.2	-3.1	-3.7	0.8	24.2	-4.2	-5.0	1.1	33.1
Portugal	629	1115	1199	-84	-0.8	0.2	0.2	0.3	-0.6	0.2	0.2	-0.8	-4.1	-1.8	0.8	35.8	-5.6	-2.6	1.1	50.5
Spain	639	5254	5492	-238	-1.5	7.5	0.5	-154.3	-0.6	7.9	0.2	-170.5	-4.1	-1.6	1.0	57.7	-6.0	3.9	1.6	-48.8
Sweden	692	1265	1339	-74	-0.6	-1.0	0.2	20.3	-0.6	-0.8	0.1	16.7	-4.1	1.5	0.8	-10.8	-5.3	0.5	1.1	11.4
United Kingdom	454	7114	7599	-485	-0.7	-0.8	0.1	14.2	-0.6	-0.7	0.1	12.2	-4.8	3.1	0.5	-37.8	-6.0	0.7	0.7	1.5
EU15	654	39921	40268	-347	-0.8	0.6	0.2	-48.1	-0.7	0.6	0.1	-47.8	-4.2	1.2	0.8	-47.9	-5.6	2.0	1.2	-100.4
EU10	425	6986	6905	82	-0.5	-1.3	0.3	-135.1	-0.5	-1.3	0.3	-140.4	-5.1	2.4	2.1	29.4	-6.4	1.4	2.8	-115.6
EU02	525	481	483	-3	-0.4	-1.7	0.1	346.5	-0.4	-1.5	0.2	311.1	-4.3	-1.7	0.3	382.6	-5.4	-3.1	0.5	691.7
EU27	619	47388	47656	-268	-0.7	0.3	0.2	-17.9	-0.6	0.3	0.2	-16.2	-4.4	1.4	1.0	-67.3	-5.6	1.9	1.4	-88.3

As industrial products increase more than raw milk availability and the growth of 'Cheese' production corresponds to that of raw milk there also has to be (at least) one product with below average increase to comply with the fat and protein balances. The most important one is the group of fresh milk products (Table 18).

Production expands only by 0.6% in the EU-15 and even in Spain the increase is only 7.5% as the milk fat and protein share in product price of fresh milk products is relatively low (35% in Spain). Production growth in some countries is almost balanced with production decline elsewhere. Prices for fresh milk products are declining by 0.8% in the EU-15 which is very similar to 'Butter', 'Skimmed milk powder', and 'Cheese'. The largest drop in prices is again expected for Spain. Note that export subsidies would support fresh product prices mainly indirectly, through an increase of supply of 'Butter', 'Skimmed milk powder' and 'Cheese' and thus decrease of raw milk available for fresh milk products. Some additional support also comes from substitution with other dairy product on the demand side (typical cross price elasticity with 'Cheese' = 0.02). Higher (or less declining) 'Cheese' prices slightly support demand for fresh milk products. Overall the demand impacts are tiny again such that net imports of the EU-15 are decreasing (by 48% or 170000 t). As production in the EU-10 and the EU-02 is declining the overall impact on net imports of the EU-27 is moderate (-18%). Large swings in net imports would be implausible because fresh milk products are less traded internationally than 'Cheese', for example.

The impact of EXPIRY on the 'Beef' market (Table 19) appears to be small at the EU-15 level, but it is sizeable in The Netherlands. In this country there would be a strong expansion of the dairy herd due to the high initial quota rent. On the other hand the suckler cow herd is only 6% of dairy cows in The Netherlands in the base year 2004 (= 84000 hds/1517000 hds) whereas in Spain there are almost twice as many suckler cows as dairy cows (2049000 hds /1090000 hds ~ 1.9). As a consequence a declining suckler cow herd can compensate much better in Spain than in The Netherlands the expansionary effects of the quota expiry on 'Beef' supply. Comparing the EXPIRY-NOSUB column with REF-NOSUB (-0.5%) we see that the impact of the quota expiry on 'Beef' prices (-0.1%) is moderated to some extent by endogenous adjustments of export refunds (from 272 €/t to 281 €/t). The increase in milk production would imply some increase in production for 'Fodder' which is assumed almost non-tradable between MS. Precisely because of the non-tradable character of 'Fodder', changes in feed demand may cause strong differences between MS with large price increases often being observed in countries with a strong increase in milk production. In addition, there are supply side effects because cereal demand is also increasing which may occasionally lead to an increasing cereal area at the expense of 'Fodder' (Denmark, Spain). Column REF-NOSUB shows that export subsidies (for meats, milk products and Cereals) also drive up 'Fodder' prices, on average by 2.5% in the EU-15 (Table 20). This occurs through indirect linkages via increased feed demand (for milk and meat production) and competition for scarce area (with Cereals).

Impacts of EXPIRY on Cereals (Table 21) are moderate: increasing milk production sizeably increases demand and sometimes decreases supply through competition with fodder. This will lead to decreased net exports from the EU which tends to increase EU border prices and thus also EU market prices. Net trade impacts can be huge in relative terms if initial net trade was small. This is the case in Austria where a demand growth of 2.3% would already suffice to change the trade position. Export refunds support market prices (-3.2% for prices in the EU-15), but only moderately, as on the 'Beef' market, because they have been very small in the base period already (and they are expected to be zero in the future, see Table 6).

Table 19: Market results for quota expiry related scenarios: Beef, 2004 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				EXPIRY-FXLINK				REF-NOSUB				EXPIRY-NOSUB			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	2822	214	149	65	-0.1	0.7	0.0	2.3	0.0	0.6	0.0	2.2	-2.9	0.2	0.2	0.1	-3.4	0.4	0.1	0.8
Belgium-Lux.	2968	310	187	122	-0.1	3.1	0.0	7.8	0.0	3.2	0.0	8.0	-2.8	-0.1	0.3	-0.7	-3.3	1.4	0.3	3.0
Denmark	1862	142	148	-6	-0.2	2.7	0.0	-64.0	0.0	2.8	0.0	-67.8	-3.0	0.0	0.1	4.0	-3.5	0.0	0.1	2.2
Finland	2276	92	95	-3	-0.1	1.0	-0.1	-31.6	0.0	1.0	-0.1	-32.8	-3.0	0.2	-0.2	-10.6	-3.5	-0.3	-0.3	-1.4
France	3435	1832	1584	249	0.0	-0.3	0.0	-2.0	0.0	-0.3	0.0	-2.3	-2.4	-0.1	-0.1	-0.1	-2.8	-0.2	-0.2	-0.8
Germany	2155	1300	1024	276	-0.1	0.9	0.0	4.5	0.0	1.0	0.0	4.7	-2.9	-0.3	0.1	-1.6	-3.5	0.0	0.0	-0.1
Greece	4449	50	180	-130	0.0	0.9	-0.1	-0.4	0.0	0.9	0.0	-0.4	-1.9	0.0	0.2	0.2	-2.2	0.0	0.1	0.1
Ireland	2329	573	47	526	0.0	1.4	-0.1	1.6	0.0	1.5	-0.1	1.6	-3.0	0.0	0.2	0.0	-3.5	0.8	0.1	0.9
Italy	3206	981	1440	-459	-0.1	2.3	0.0	-5.0	0.0	2.4	0.0	-5.2	-2.6	0.0	0.2	0.6	-3.1	1.4	0.1	-2.5
Netherlands	3306	376	334	43	-0.4	6.7	0.0	59.0	0.0	6.8	0.0	60.7	-2.5	0.3	0.1	1.9	-3.2	5.5	0.1	48.3
Portugal	3500	117	194	-77	-0.1	1.0	0.0	-1.6	0.0	1.0	0.0	-1.6	-2.3	-0.2	0.2	0.9	-2.8	0.1	0.3	0.6
Spain	2860	682	638	43	0.0	-0.6	-0.1	-8.1	0.0	-0.7	0.0	-10.2	-2.9	-0.1	0.4	-7.1	-3.3	-0.6	0.4	-15.0
Sweden	2573	141	205	-64	0.0	0.2	0.0	-0.6	0.0	0.2	0.0	-0.6	-3.0	-0.2	0.0	0.5	-3.5	-0.1	0.0	0.3
United Kingdom	3030	812	1162	-350	0.0	-0.3	0.0	0.7	0.0	-0.4	0.0	0.8	-2.7	-0.1	0.0	0.2	-3.2	-0.8	0.1	2.2
EU15	2915	7622	7388	234	-0.1	1.0	0.0	32.3	0.0	1.0	0.0	32.7	-2.6	-0.1	0.1	-5.2	-3.1	0.4	0.1	10.2
EU10	1637	699	612	87	-0.3	1.1	0.1	7.9	-0.1	1.2	0.0	9.4	-2.9	0.0	0.2	-0.8	-3.6	0.3	0.2	1.6
EU02	1966	260	281	-21	-0.3	1.8	0.2	-19.3	0.0	1.9	0.1	-21.7	-2.8	0.0	0.7	8.0	-3.4	0.3	0.8	6.5
EU27	2782	8581	8281	300	-0.1	1.0	0.0	28.9	-0.1	1.0	0.0	29.9	-2.7	-0.1	0.1	-4.8	-3.1	0.4	0.1	7.9

Table 20: Market results for quota expiry related scenarios: Fodder, 2004 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				EXPIRY-FXLINK				REF-NOSUB				EXPIRY-NOSUB			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	18	39858	39858	0	0.0	0.7	0.7		0.3	0.8	0.7		-3.0	-0.1	-0.1		-3.0	0.4	0.4	
Belgium-Lux.	19	33059	33059	0	15.7	0.6	0.6		15.9	0.6	0.6		-4.1	0.0	0.0		4.0	0.3	0.3	
Denmark	31	19322	19322	0	-1.2	-0.1	-0.1		-1.2	-0.1	-0.2		-1.0	0.0	0.0		-0.5	0.1	0.1	
Finland	37	9320	9320	0	1.1	0.1	0.1		1.1	0.1	0.1		-1.5	0.0	0.0		-2.0	-0.1	-0.1	
France	21	320549	320549	0	7.1	0.6	0.6		7.3	0.6	0.6		-2.5	-0.1	-0.1		-0.6	0.1	0.1	
Germany	23	225842	225842	0	2.2	0.1	0.1		2.3	0.1	0.1		-0.3	0.0	0.0		-0.5	0.0	0.0	
Greece	28	20187	20187	0	2.3	0.1	0.0		2.4	0.1	0.0		-3.8	0.0	0.0		-6.3	0.0	-0.1	
Ireland	8	132761	132761	0	18.7	0.3	0.3		18.5	0.3	0.4		-4.4	0.0	0.0		6.5	0.2	0.2	
Italy	25	91034	91034	0	19.5	0.9	0.9		20.7	1.0	1.0		-1.8	-0.1	-0.1		10.5	0.5	0.5	
Netherlands	14	55041	55041	0	95.1	2.8	2.9		96.7	2.8	3.0		-11.5	0.0	0.0		68.0	2.3	2.4	
Portugal	14	26158	26158	0	3.2	0.4	0.4		3.4	0.4	0.4		-2.3	-0.1	-0.1		-2.2	0.0	0.0	
Spain	17	127241	127241	0	17.6	-0.1	-0.1		18.9	-0.1	-0.1		-2.4	0.0	0.0		10.5	-0.1	-0.1	
Sweden	32	27542	27542	0	0.0	0.0	0.0		0.0	0.0	0.0		-0.8	-0.1	-0.1		-4.6	-0.3	-0.3	
United Kingdom	10	268879	268879	0	0.6	0.0	0.0		0.6	0.0	0.0		-4.5	0.0	0.0		-4.5	-0.1	-0.2	
EU15	18	1396793	1396793	0	11.3	0.4	0.4		11.7	0.4	0.4		-2.5	0.0	0.0		4.2	0.1	0.1	
EU10	15	164863	164863	0	-0.5	0.0	0.0		-0.5	0.0	0.0		-2.9	0.1	0.1		-5.6	0.0	0.0	
EU02	33	85962	85962	0	2.3	0.0	0.0		2.4	0.0	0.0		-1.3	0.0	0.0		-3.7	0.0	0.0	
EU27	18	1647618	1647618	0	9.9	0.3	0.3		10.3	0.3	0.3		-2.5	0.0	0.0		3.0	0.1	0.1	

Table 21: Market results for quota expiry related scenarios: Cereals, 2004 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				EXPIRY-FXLINK				REF-NOSUB				EXPIRY-NOSUB			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	90	5041	4998	43	0.5	0.0	2.3	-264.3	0.1	0.0	2.4	-283.5	-3.9	-0.2	0.3	-61.7	-3.5	-0.2	2.1	-264.2
Belgium-Lux.	96	2684	5701	-3017	0.3	-0.8	4.2	8.6	0.2	-0.9	4.3	8.8	-3.1	1.0	0.2	-0.5	-2.9	0.6	2.6	4.4
Denmark	108	9372	9007	365	0.4	0.0	1.6	-38.3	0.2	0.0	1.6	-39.9	-3.4	-0.1	0.1	-4.5	-3.3	-0.1	0.0	-1.9
Finland	100	4010	3628	382	0.2	0.0	0.8	-7.9	0.1	0.0	0.9	-8.4	-4.1	-0.2	0.3	-4.4	-4.0	-0.2	-0.1	-0.6
France	102	63607	31619	31989	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	-3.3	-0.3	0.3	-0.9	-3.2	-0.3	0.3	-0.9
Germany	99	46604	40461	6143	0.2	0.1	0.8	-4.6	0.2	0.1	0.8	-4.9	-3.4	-0.2	0.1	-2.5	-3.3	-0.2	-0.2	0.0
Greece	157	4274	5866	-1592	0.1	0.0	0.2	0.5	0.1	0.0	0.2	0.6	-2.4	-0.7	0.0	1.8	-2.3	-0.7	-0.1	1.4
Ireland	90	2284	3017	-733	0.7	-2.0	4.8	25.8	0.1	-2.1	5.0	26.9	-3.7	0.3	0.5	1.2	-3.2	-0.9	3.5	16.9
Italy	140	19480	25349	-5869	0.4	-0.3	1.8	8.9	0.1	-0.4	2.0	9.9	-2.7	-0.1	0.1	0.8	-2.5	-0.2	1.4	6.7
Netherlands	104	1750	7577	-5826	0.3	-9.7	6.6	11.5	0.2	-9.9	6.7	11.6	-3.3	2.4	0.9	0.4	-2.9	-5.5	6.5	10.0
Portugal	141	1024	4294	-3270	0.1	0.2	0.2	0.2	0.1	0.3	0.2	0.2	-3.1	-0.4	0.2	0.4	-3.0	-0.3	0.2	0.4
Spain	128	19727	27311	-7583	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	-3.2	-0.9	0.1	2.8	-3.0	-0.8	0.3	3.1
Sweden	91	5494	4347	1147	0.1	0.0	-0.2	0.9	0.2	0.0	-0.2	0.9	-3.5	-0.3	-0.1	-1.4	-3.5	-0.5	-0.9	1.2
United Kingdom	106	21872	21066	806	0.1	0.0	-0.3	7.9	0.2	0.0	-0.3	8.3	-3.1	-0.2	-0.1	-4.5	-3.1	-0.2	-0.9	18.6
EU15	109	207224	194238	12985	0.2	-0.1	1.0	-16.7	0.1	-0.1	1.0	-17.6	-3.2	-0.3	0.2	-6.8	-3.1	-0.3	0.5	-13.5
EU10	89	59698	54577	5121	0.1	0.0	-0.1	1.3	0.2	0.0	-0.1	1.4	-3.7	-0.1	0.1	-2.0	-3.7	-0.1	-0.8	7.9
EU02	123	25851	25403	447	0.1	0.0	0.0	4.0	0.1	0.0	-0.1	4.8	-3.1	-0.4	0.0	-20.2	-3.1	-0.3	-0.4	2.6
EU27	106	292772	274219	18554	0.2	-0.1	0.7	-11.2	0.1	-0.1	0.7	-11.8	-3.3	-0.2	0.1	-5.8	-3.2	-0.3	0.2	-7.2

4.2.2 Dairy scenarios: 2014

As explained in Section 4.1 two policy scenarios (EXPIRY-SOFT, EXPIRY-FAST) will be investigated for the year 2014, the year immediately before the scheduled expiry of the quota system. Scenario EXPIRY-SOFT corresponds to current Commission plans whereas EXPIRY-FAST is a hypothetical scenario with fast abolition in 2009.

Their impacts relative to the status quo reference run are a further test of CAPSIM's responsiveness under market conditions different from the base year, but they are also interesting for an assessment of consequences of current Commission plans for dairy markets in 2014. Because the interest is clearly directed towards dairy markets, the selected tables will also focus on those, but in contrast to Subection 4.2.1 covering all the EU-27 members individually.

Due to its comparative static character CAPSIM cannot provide reliable information on the short run impacts of the expiry in 2015 (or shortly thereafter). As the expiry is basically decided for 2015, the most relevant analysis of impacts without counterfactual elements therefore occurs for the year 2020.

Scenario EXPIRY-FAST is basically the same policy experiment that has been investigated in Subsection 4.2.1 and will be discussed again in Subsection 4.2.3: the quota system expires at some point in time without preparation (assumed to be in 2009 here) and impacts are observed 5 years later, such that adjustments to the new equilibrium are well advanced. In spite of the same question being asked the results are quite different. Most importantly, because driving all other impacts, milk production would only increase by 2.4% in the EU-15 (Table 22) and 2.1% in the EU-27. The corresponding increase for the EU-15 in Table 14 above has been 5.1%. The reduction of the expansionary impact stems from a decline in the quota rents and their underlying determinants (see Subsection 2.2.2), including raw milk prices (Table 7) such that the expected increase in production would be lower than in the counterfactual analysis for 2004. The distribution of production impacts closely resembles that of Figure 9 above as the pattern of quota rents would be stable, even though on a lower level (Figure 10, compare also Figure 5).

Note that countries with zero quota rents in the reference are expected to reduce their production because market prices of dairy products are driven down by expanding countries. Depending on production increase, yield growth and price changes countries may change their position to some extent. Such a case is Poland, expected to become increasingly competitive over time.

A lower production increase would also suggest that raw milk prices would decrease less than under the EXPIRY scenario for 2004 but this does not hold: prices are declining by 5.5% in the EU-15 according to EXPIRY-FAST in this section whereas the decline was only 4.2% in Subsection 4.2.1. The explanation may be given in terms of stronger declining prices for derived dairy products based from Table 23 to Table 26. Dairy markets will also explain the sizeable difference in raw milk price changes expected in this study for The Netherlands (-8%) and Spain (-19%) in spite of a nearly identical increase in production.

Figure 10: Quota expiry impacts on cow milk production and quota rents in the reference for 2014 (%)

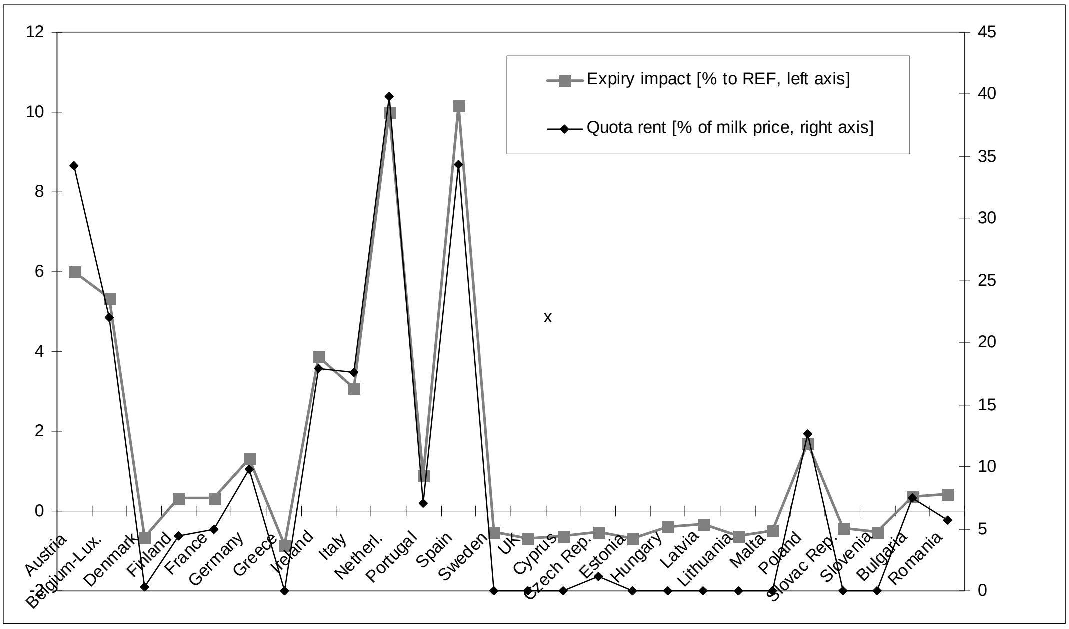


Table 22: Market results for quota expiry related scenarios: cow milk, 2014 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY-FAST				EXPIRY-SOFT			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%
Austria	233	3242	3080	162	-13.8	6.0	6.3	0.4	-9.9	4.3	4.5	0.3
Belgium-Lux.	232	3425	3489	-64	-8.5	5.3	5.2	-0.4	-7.4	4.9	4.8	-0.4
Denmark	250	4742	4756	-14	-2.9	-0.7	-0.6	1.8	-2.2	-0.5	-0.5	1.4
Finland	296	2558	2557	1	-3.1	0.3	0.3	-16.3	-2.6	0.5	0.5	-10.9
France	247	26024	25495	530	-3.6	0.3	0.4	-0.2	-3.1	0.5	0.5	-0.1
Germany	268	30568	30168	400	-4.2	1.3	1.3	-0.2	-3.6	1.5	1.5	-0.1
Greece	244	889	929	-40	-3.9	-0.9	-0.8	0.1	-2.9	-0.6	-0.6	0.1
Ireland	233	5386	5674	-288	-4.8	3.9	3.7	0.0	-4.4	4.0	3.8	0.0
Italy	296	11690	12905	-1215	-7.4	3.1	2.8	-0.1	-6.7	3.3	2.9	-0.1
Netherlands	304	11119	11618	-499	-7.9	10.0	9.6	-0.1	-4.6	5.0	4.8	0.0
Portugal	265	2167	2147	20	-4.2	0.9	0.9	-0.3	-3.6	1.1	1.1	-0.1
Spain	266	6601	6550	51	-18.7	10.2	10.2	4.4	-9.9	4.8	4.8	1.8
Sweden	287	3282	3178	104	-2.3	-0.5	-0.5	-0.2	-1.8	-0.4	-0.4	-0.2
United Kingdom	268	14910	14613	297	-2.1	-0.7	-0.7	-0.4	-1.6	-0.5	-0.5	-0.3
EU15	266	126603	127158	-556	-5.5	2.4	2.4	-0.2	-4.1	1.8	1.8	-0.1
Cyprus	335	153	153	0	-1.7	-0.6	-0.6	3.3	-1.2	-0.5	-0.5	2.6
Czech Republic	205	2780	2707	73	-2.9	-0.5	-0.5	-0.2	-2.3	-0.4	-0.4	-0.1
Estonia	203	633	652	-19	-2.5	-0.7	-0.7	0.2	-1.9	-0.6	-0.5	0.2
Hungary	234	1951	1919	31	-2.9	-0.4	-0.4	-0.3	-2.2	-0.3	-0.3	-0.3
Latvia	173	821	825	-3	-2.4	-0.3	-0.3	1.5	-1.8	-0.2	-0.2	1.1
Lithuania	167	1830	1769	61	-2.2	-0.6	-0.6	-0.2	-1.5	-0.5	-0.5	-0.2
Malta	294	40	39	1	-4.0	-0.5	-0.5	-0.1	-2.9	-0.4	-0.4	-0.1
Poland	192	11883	11846	38	-6.5	1.7	1.7	1.0	-6.0	1.9	1.9	1.5
Slovac Republic	228	975	1090	-115	-2.6	-0.4	-0.4	0.1	-2.0	-0.3	-0.3	0.0
Slovenia	222	667	647	20	-2.3	-0.5	-0.5	-0.2	-1.7	-0.4	-0.4	-0.2
EU10	199	21732	21646	86	-4.7	0.7	0.7	-0.2	-4.2	0.9	0.9	0.1
Bulgaria	167	1299	1299	0	-4.2	0.3	0.3	8.3	-3.5	0.5	0.5	4.2
Romania	181	4858	4859	-1	-1.8	0.4	0.4	40.0	-1.6	0.5	0.5	27.9
EU02	178	6157	6158	-1	-2.3	0.4	0.4	31.3	-2.0	0.5	0.5	21.4
EU27	253	154492	154963	-471	-5.3	2.1	2.1	-0.1	-4.0	1.6	1.6	-0.1

The right columns show that the total quota expansion of 5% under scenario EXPIRY-SOFT comes close to the full effect of EXPIRY-FAST, as only Austria, Belgium-Luxembourg, The Netherlands and Spain would still have positive (percentage) quota rents. The market impacts including the decline of raw milk prices would be somewhat smaller under EXPIRY-SOFT (in EU-27 -4.0%) than under EXPIRY-FAST (-5.3%). With higher raw milk prices production would be higher, hence changes more positive, in all countries except in the four mentioned above.

The hypothetical scenario EXPIRY-FAST would have increased in the EU-27 'Butter' production by 4.5 %, and eliminated 79% of the net imports simulated in the reference run for 2014 (Table 23). As in the counterfactual expiry scenario for 2004 the endogenous adjustment of export subsidies (up by 75 €/t) assumes an effective limitation for the decline of 'Butter' prices (to 0.5% in the EU-27). Price changes range from a decline by 1% in Spain (where net exports increase from near zero to about 6000 t) to a small increase by 0.1% in Slovenia. Percentage changes in net trade can be quite large if initial values are very small.

Scenario EXPIRY-SOFT would imply a smaller increase in production on the EU-27 level (+3.6% rather than + 4.5% as under EXPIRY-FAST) such that related price changes are also smaller. A detailed look at MS results confirms that the differences are largest in the three MS with highest quota rents. Impacts on production and prices would stay closer to the EU-15 average in these MS under EXPIRY-SOFT than under EXPIRY-FAST.

Table 23: Market results for quota expiry related scenarios: Butter, 2014 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY-FAST				EXPIRY-SOFT			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%
Austria	3104	29	39	-10	-0.7	14.6	0.0	-40.1	-0.5	10.2	0.0	-28.2
Belgium-Lux.	2540	116	105	11	-0.3	6.5	0.0	68.0	-0.3	5.8	0.0	61.0
Denmark	3235	96	97	0	-0.1	0.4	0.0	-115.6	-0.1	0.3	0.0	-73.3
Finland	2476	47	35	12	-0.1	0.8	0.0	3.2	-0.1	0.9	0.0	3.4
France	3931	403	477	-74	-0.2	2.3	0.0	-12.3	-0.2	2.1	0.0	-11.1
Germany	2822	401	518	-116	-0.3	3.9	0.0	-13.4	-0.3	3.8	0.0	-13.1
Greece	4808	2	9	-7	-0.1	0.2	0.0	0.0	-0.1	0.0	0.0	0.0
Ireland	3089	132	16	116	-0.1	6.3	0.0	7.1	-0.1	6.1	0.0	6.9
Italy	3039	122	168	-46	-0.3	5.4	0.1	-14.1	-0.3	5.5	0.1	-14.3
Netherlands	2372	168	74	94	-0.3	12.6	0.0	22.5	-0.2	6.3	0.0	11.3
Portugal	3254	22	17	5	-0.2	2.0	0.0	8.6	-0.1	2.0	0.0	8.6
Spain	2319	41	41	0	-1.0	13.7	0.3	2358.1	-0.5	6.4	0.2	1103.0
Sweden	3025	40	36	4	0.0	-0.8	0.0	-8.4	0.0	-0.8	0.0	-8.5
United Kingdom	2352	96	187	-91	-0.1	-0.6	-0.1	0.5	-0.1	-0.6	0.0	0.5
EU15	3048	1716	1820	-104	-0.6	4.6	0.0	-75.3	-0.4	3.6	0.0	-58.9
Cyprus	4324	0	1	-1	-0.1	-0.8	0.0	0.2	-0.1	-0.8	0.0	0.2
Czech Republic	2577	53	42	11	-0.1	-0.3	0.0	-1.5	-0.1	-0.3	0.0	-1.2
Estonia	2304	6	5	0	-0.1	0.1	0.1	1.8	-0.1	-0.2	0.0	-4.3
Hungary	2684	5	9	-4	-0.2	1.3	0.1	-1.4	-0.1	0.7	0.0	-0.8
Latvia	1990	6	6	0	-0.1	-0.3	-0.1	-8.6	-0.1	-0.3	-0.1	-7.3
Lithuania	2309	7	7	0	0.1	-1.9	0.0	-229.4	0.1	-2.0	0.0	-235.6
Malta	3542	0	0	0	-0.1	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.0
Poland	2062	112	116	-5	-0.5	7.0	0.3	-166.0	-0.5	7.1	0.3	-170.4
Slovac Republic	2579	9	9	0	-0.1	0.2	0.0	67.6	-0.1	0.0	0.0	-17.4
Slovenia	2552	4	2	2	0.1	-2.3	0.0	-5.0	0.1	-1.9	0.0	-4.3
EU10	2262	203	200	3	-0.6	3.7	0.1	230.6	-0.6	3.8	0.1	236.5
Bulgaria	2141	6	7	-1	-0.2	1.9	0.1	-18.3	-0.2	1.8	0.1	-17.4
Romania	2271	7	13	-6	0.0	-3.2	0.0	3.4	0.0	-2.0	0.0	2.2
EU02	2208	13	20	-7	-0.2	-0.7	0.0	1.4	-0.2	-0.1	0.0	0.3
EU27	2959	1933	2041	-108	-0.5	4.5	0.0	-79.1	-0.4	3.6	0.0	-63.6

The EU-27 production of 'Skimmed milk powder' would increase by almost 6% which is again more than the driving increase in raw milk production (+2.1%) as typical for industrial dairy products (see Table 24). In contrast to 'Butter' there are no export subsidies in the reference (Table 6) and they would not be reintroduced as well. The resulting decline of prices is therefore not counteracted by Commission market management such that EU prices would decline stronger than for 'Butter' and stronger than in the counterfactual analysis for

2004 by 3.5%. Price drops are higher in MS[33] with a strong increase of non-negligible net exports (Austria, Spain) and they are below average if sizeable net imports are increasing (UK, Romania). Demand is stimulated by declining prices (+1.9% for the EU-27). Differences in demand growth are less motivated by differences in price changes (all about 3 - 5%) than by other factors. Among those are the shares of feed demand in total demand (as human demand is less responsive) and output effects from changing meat production. As demand growth is smaller than supply growth on average, the EU-27 net imports of 'Skimmed milk powder' would decline by 45%.

Scenario EXPIRY-SOFT would yield smaller impacts on the EU-27 level than EXPIRY-FAST (production +4.5% rather than +5.8%) but the differences are clearer for Austria, The Netherlands and Spain.

Table 24: Market results for quota expiry related scenarios: Skimmed milk powder, 2014 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY-FAST				EXPIRY-SOFT			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%
Austria	2095	6	3	2	-4.3	21.8	0.8	52.9	-3.3	14.8	0.6	35.8
Belgium-Lux.	1982	76	59	17	-3.6	11.6	1.2	48.2	-2.9	10.0	0.9	42.1
Denmark	2059	23	14	9	-3.0	1.0	1.4	0.4	-2.4	0.4	1.1	-0.7
Finland	2120	20	25	-5	-3.0	1.4	1.6	2.4	-2.4	1.1	1.3	2.1
France	1901	171	172	-1	-3.4	1.1	0.4	-87.8	-2.7	0.9	0.2	-79.2
Germany	1987	189	142	46	-3.4	4.5	1.2	14.8	-2.8	3.9	0.9	13.1
Greece	2067	0	2	-2	-3.0	0.0	0.6	0.6	-2.5	0.0	0.6	0.6
Ireland	2065	63	25	38	-3.1	3.9	1.3	5.5	-2.5	4.3	0.9	6.5
Italy	2072	0	107	-107	-3.0	0.0	1.5	1.5	-2.5	0.0	1.2	1.2
Netherlands	1989	46	158	-111	-3.3	17.2	5.1	0.1	-2.6	8.2	2.8	0.6
Portugal	2096	6	12	-6	-3.2	5.8	2.1	-1.9	-2.6	5.1	1.8	-1.9
Spain	2063	9	19	-11	-4.9	55.8	1.9	-43.1	-3.4	27.0	1.3	-20.1
Sweden	2132	24	33	-9	-3.1	1.8	1.4	0.5	-2.4	0.8	1.1	2.1
United Kingdom	2234	62	82	-20	-2.8	-0.7	0.4	3.9	-2.2	-1.2	0.3	5.1
EU15	2009	694	853	-159	-3.3	5.3	1.8	-13.6	-2.7	3.8	1.2	-10.4
Cyprus	2702	0	0	0	-2.3	0.0	0.0	0.0	-1.9	0.0	0.0	0.0
Czech Republic	1724	29	4	25	-3.3	-0.1	2.2	-0.5	-2.7	-0.5	1.8	-0.9
Estonia	1522	10	4	5	-3.2	0.7	4.9	-2.8	-2.6	0.1	3.9	-3.0
Hungary	1822	3	2	1	-3.1	-1.2	2.2	-7.1	-2.5	-1.5	1.7	-7.1
Latvia	1996	0	0	0	-3.0	-5.2	-0.1	-8.6	-2.4	-5.0	-0.1	-8.2
Lithuania	1665	5	1	4	-3.3	0.4	0.0	0.5	-2.7	-1.1	0.0	-1.3
Malta	2304	0	3	-3	-2.7	0.0	1.7	1.7	-2.2	0.0	1.4	1.4
Poland	1383	96	35	61	-3.4	13.8	5.2	18.7	-2.8	13.1	4.3	18.2
Slovac Republic	1746	7	7	1	-3.0	-0.3	2.4	-29.7	-2.4	-0.7	1.9	-28.6
Slovenia	1723	2	0	2	-3.3	0.6		0.6	-2.7	-0.4		-0.4
EU10	1498	153	56	97	-4.0	8.7	4.3	11.2	-3.3	8.1	3.5	10.8
Bulgaria	1401	8	14	-6	-3.4	2.8	0.6	-2.6	-2.7	2.2	0.5	-2.0
Romania	2373	3	7	-4	-2.7	-1.6	1.7	3.9	-2.1	-1.5	1.4	3.5
EU02	1640	11	21	-10	-3.6	1.7	0.9	0.0	-2.9	1.3	0.8	0.2
EU27	1913	858	930	-72	-3.5	5.8	1.9	-45.1	-2.9	4.5	1.3	-37.3

'Cheese' production (Table 25) is projected to rise under EXPIRY-FAST on average in the EU-27 by 1.6%, which is less than the expansion of raw milk and much less than industrial products increase. Prices are nonetheless declining by 2% in the EU-27 because export subsidies are expected to be zero and to remain zero. Demand is growing (+0.8% in EU-27), but clearly less than supply such that net exports increase by 21%. Differences in national net trade changes may be checked to relate to below or above average price changes in MS. Impacts of EXPIRY-SOFT are in general somewhat smaller than those under EXPIRY-

[33] Note that the average price in the EU-10 declines more (-4.0%) than the largest decline in any EU-10 member (Poland: -3.4%). This is because the weight for Poland in the EU-10 average increases from 96/153 = 63% to 110/166 = 66% while Poland is at the same time the country with lowest skimmed milk powder prices in the EU-10 according to the CAPSIM database (in line with low raw milk prices).

FAST. The key differences are lower production in Austria, The Netherlands and Spain. As in 2004 The Netherlands has the strongest expiry impacts on 'Cheese', whereas Spain has the strongest ones for 'Butter', 'Skimmed milk powder' and fresh milk products. The reason is that, in contrast to Spain, fairly low 'Cheese' prices indicate low margins in Dutch 'Cheese' production which would benefit greatly from cheaper raw milk. Conversely for other products this low margin explanation applies to Spain.

Table 25: Market results for quota expiry related scenarios: Cheese, 2014 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY-FAST				EXPIRY-SOFT			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%
Austria	5177	153	181	-28	-2.5	5.7	0.5	-28.1	-1.9	4.0	0.4	-19.9
Belgium-Lux.	3155	75	247	-172	-2.1	3.6	0.6	-0.6	-1.6	3.4	0.5	-0.8
Denmark	4796	370	154	217	-1.9	-1.6	0.4	-3.0	-1.4	-1.1	0.3	-2.2
Finland	3724	120	106	15	-2.0	0.1	0.7	-4.5	-1.5	0.4	0.5	-0.6
France	5536	1976	1648	328	-1.5	-1.3	0.6	-10.8	-1.2	-0.8	0.5	-7.1
Germany	3618	1991	1871	119	-2.1	1.1	0.6	7.9	-1.6	1.3	0.5	14.4
Greece	6364	239	316	-78	-1.3	-0.9	0.6	5.2	-1.0	-0.7	0.4	3.8
Ireland	5587	157	35	122	-1.7	1.6	0.5	2.0	-1.3	2.1	0.3	2.6
Italy	5522	1246	1353	-107	-2.0	3.1	0.5	-29.6	-1.6	3.3	0.4	-33.6
Netherlands	3823	761	392	369	-2.6	11.6	0.9	23.0	-1.8	5.9	0.6	11.4
Portugal	5135	88	120	-32	-1.9	1.0	0.8	0.3	-1.4	1.2	0.6	-1.1
Spain	5140	346	482	-136	-2.6	11.3	0.9	-25.6	-1.7	5.4	0.6	-11.7
Sweden	4640	130	190	-60	-1.9	-1.2	0.5	4.4	-1.4	-0.9	0.4	3.2
United Kingdom	4675	363	610	-247	-1.8	-2.5	0.7	5.4	-1.4	-1.8	0.5	4.0
EU15	4755	8015	7705	309	-2.1	2.0	0.6	35.3	-1.6	1.4	0.5	25.5
Cyprus	6902	11	13	-1	-1.2	-0.8	0.7	13.1	-0.9	-0.6	0.5	10.0
Czech Republic	4247	146	155	-9	-1.8	-0.8	1.5	38.5	-1.3	-0.5	1.1	26.9
Estonia	3808	30	24	7	-1.9	-0.8	1.8	-9.7	-1.4	-0.5	1.3	-6.8
Hungary	4395	81	74	7	-1.8	-0.6	1.3	-22.3	-1.4	-0.5	0.9	-16.5
Latvia	3315	39	36	3	-1.7	-1.4	1.8	-42.3	-1.3	-1.0	1.3	-30.8
Lithuania	2952	106	46	60	-1.9	-1.4	2.9	-4.7	-1.4	-1.0	2.1	-3.4
Malta	5706	5	10	-6	-1.6	-0.3	1.1	2.2	-1.2	-0.3	0.8	1.6
Poland	3380	620	575	45	-1.8	-0.1	2.2	-29.3	-1.4	0.3	1.6	-17.3
Slovac Republic	4327	47	40	7	-1.8	-1.0	1.3	-14.9	-1.4	-0.7	0.9	-10.9
Slovenia	4219	27	25	2	-1.7	-1.0	1.1	-24.3	-1.3	-0.7	0.8	-17.8
EU10	3644	1113	999	114	-1.8	-0.5	1.9	-21.6	-1.4	-0.2	1.4	-14.1
Bulgaria	3597	85	97	-12	-1.9	-0.8	1.1	14.2	-1.5	-0.3	0.8	8.3
Romania	3808	61	86	-25	-1.8	-1.8	1.0	7.9	-1.3	-1.0	0.7	5.1
EU02	3685	146	183	-37	-1.9	-1.2	1.0	9.9	-1.4	-0.6	0.8	6.2
EU27	4605	9273	8887	387	-2.0	1.6	0.8	20.9	-1.5	1.2	0.6	15.6

Apart from 'Cheese', production of fresh milk products would also increase less in the EU-27 (+0.6%) than raw milk availability thus, permitting industrial products to expand more than proportionately (see Table 26). As it turns out a non-negligible increase is only expected for Austria, Belgium-Luxembourg, Spain, and Poland which is sufficient to drive down in the EU-27 prices by 1.3%. Other countries are expected to be stable or to decrease their production. It is interesting to note that The Netherlands are also in the group of countries with decreasing production which is imposed by fat and protein balances, given the strong expansion of 'Cheese' production there, combined with a high weight for 'Cheese' in the product mix of Dutch dairies. Declining prices are also expected to stimulate demand growth by 0.5% in the EU-27 which is slightly less than the increase in production. As a consequence there would be a change in the trade position from net imports of 29000 t under REF to net exports of 18000 t under EXPIRY-FAST. Compared to total production (49 m t) these are very small quantities. Impacts under EXPIRY-SOFT on production and related variables are even smaller, as the only two countries with a sizeable expansion under EXPIRY-FAST, Austria and Spain, would have to reduce their expansion such that overall EU-27 production only increases by 0.5% and the price drop goes down to 1% only.

Table 26: Market results for quota expiry related scenarios: Fresh milk products, 2014 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY-FAST				EXPIRY-SOFT			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%
Austria	706	925	767	158	-1.9	4.7	0.5	24.8	-1.4	3.3	0.4	17.6
Belgium-Lux.	688	1409	993	416	-1.4	1.1	0.4	2.6	-1.1	1.3	0.3	3.6
Denmark	830	735	746	-11	-1.1	-0.2	0.3	35.1	-0.8	-0.1	0.2	25.1
Finland	796	1010	994	15	-1.2	0.1	0.4	-15.3	-0.9	0.2	0.3	-2.5
France	911	6167	6040	127	-1.0	0.0	0.5	-21.9	-0.7	0.1	0.4	-14.3
Germany	500	9284	8038	1247	-1.4	0.0	0.4	-2.4	-1.1	0.4	0.3	1.0
Greece	1085	728	844	-116	-0.9	0.3	0.5	1.7	-0.6	0.2	0.4	1.2
Ireland	897	685	833	-148	-0.9	-1.5	0.4	9.2	-0.6	-1.2	0.3	7.3
Italy	1050	3355	4045	-691	-0.8	-1.2	0.3	7.3	-0.6	-1.1	0.2	6.7
Netherlands	819	1574	2113	-539	-1.1	-0.6	0.4	3.2	-0.8	-0.5	0.3	2.5
Portugal	683	1111	1275	-164	-1.4	0.0	0.5	4.0	-1.0	0.2	0.4	1.6
Spain	694	5234	5918	-684	-1.8	5.0	0.8	-31.4	-1.2	2.3	0.5	-13.0
Sweden	744	1275	1397	-122	-1.2	-0.3	0.4	7.3	-0.9	-0.2	0.3	5.1
United Kingdom	489	7315	7656	-341	-1.4	0.1	0.3	5.0	-1.0	0.1	0.2	2.3
EU15	697	40806	41659	-853	-1.3	0.7	0.4	-10.0	-1.0	0.4	0.3	-4.0
Cyprus	886	80	93	-13	-1.0	-0.4	0.2	4.4	-0.8	-0.3	0.2	3.2
Czech Republic	662	676	738	-62	-1.2	-0.9	0.5	16.5	-0.9	-0.6	0.4	11.7
Estonia	637	185	181	4	-1.2	-1.1	0.5	-76.6	-0.9	-0.9	0.3	-57.2
Hungary	668	809	848	-39	-1.3	-0.6	0.5	23.3	-1.0	-0.4	0.3	16.8
Latvia	328	133	84	49	-1.2	-1.1	0.9	-4.6	-0.9	-0.8	0.7	-3.3
Lithuania	503	312	337	-26	-1.2	-1.6	0.5	25.5	-0.9	-1.2	0.4	19.5
Malta	611	38	35	3	-1.3	-0.6	0.5	-16.0	-1.0	-0.5	0.4	-11.9
Poland	411	5122	4357	765	-1.4	1.3	1.3	1.1	-1.1	1.5	1.0	4.5
Slovac Republic	571	401	301	101	-1.3	-0.6	0.7	-4.5	-1.0	-0.4	0.5	-3.2
Slovenia	652	306	262	43	-1.2	-1.2	0.4	-11.1	-0.9	-0.9	0.3	-8.1
EU10	488	8062	7237	825	-1.5	0.5	1.0	-4.0	-1.2	0.7	0.8	0.5
Bulgaria	693	187	201	-14	-1.3	-0.6	0.1	10.2	-1.0	-0.5	0.0	7.9
Romania	519	312	299	13	-1.3	-0.8	0.4	-27.8	-1.0	-0.4	0.2	-15.0
EU02	584	499	500	-1	-1.3	-0.7	0.3	694.0	-1.0	-0.4	0.2	420.6
EU27	662	49368	49397	-29	-1.3	0.6	0.5	-162.9	-1.0	0.5	0.4	-121.3

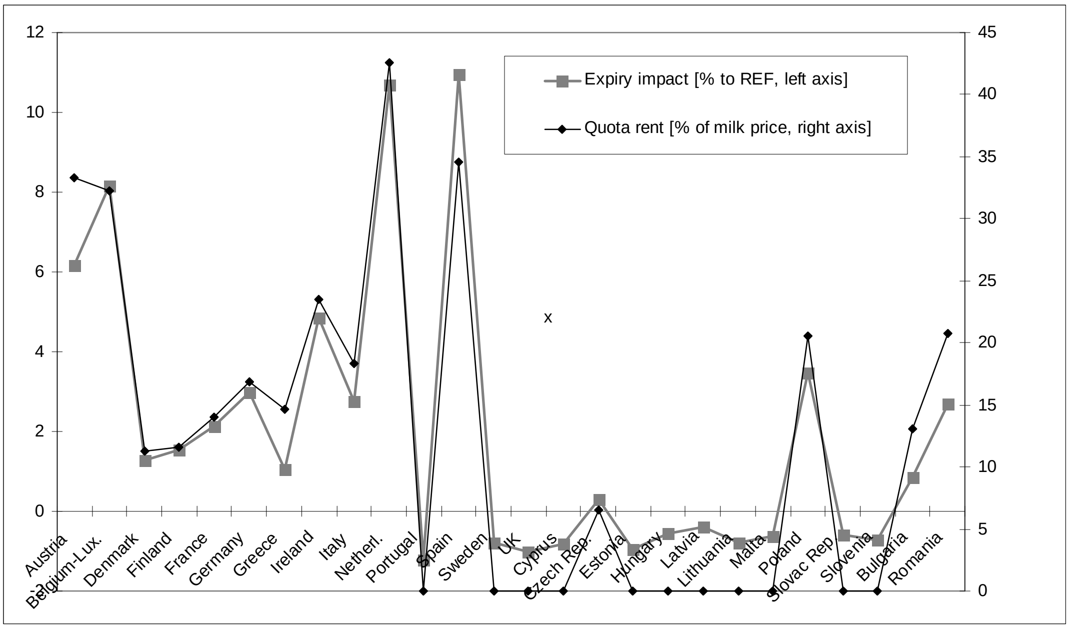
Overall it may be concluded that the differences of EXPIRY-FAST and EXPIRY-SOFT are only small. Thus it follows indirectly that the soft landing strategy would indeed guide the EU dairy sector into the future without quotas.

4.2.3 Dairy scenarios: 2020

In line with its comparative static character CAPSIM is best suited to investigate impacts of the quota expiry a few years after the quotas system is scheduled to expire (2015). The analysis will be carried out for 2020 such that comparisons with Réquillart et al. (2008) are possible. A key result of the analysis is that EU-27 raw milk production would increase by 3.1 %, driving down milk prices by 7.3% on average (Table 27). These changes are somewhat less than those obtained by Réquillart et al. (2008) (from Annex, p.14: -4.8% for production, -8.7% for prices). The projected increase in milk production for 2020 in the EU-27 under EXPIRY is somewhat higher than the 2.1% simulated under EXPIRY-FAST for 2014 (Table 22) because economic conditions will have improved for the dairy sector: demand growth will have supported dairy prices which also increases raw milk prices while production yields will have improved as well (Table 7).

Again the regional distribution is crucially determined by the quota rents which follow a pattern (Figure 11) very similar to the one for 2014. Indeed the main difference of the 2020 curves is their slightly higher level apart from the fact that Denmark and Greece have returned to the group of MS with increasing production again.

Figure 11: Quota expiry impacts on cow milk production and quota rents in the reference for 2020 (%)



The pattern of price changes in the EU-27 is partly determined by the production increases and partly by indirect effects from decreasing prices on dairy markets.

Columns REF-NOSUB and EXPIRY-NOSUB give the results of the sensitivity analysis without export subsidies. These differ markedly from the 2004 results in Table 14 because export subsidies have become irrelevant, apart from 'Butter'. This is very similar to the situation in 2014 (Table 6). As a consequence, scenario REF-NOBUB has only small impacts on raw milk prices (-0.5% in the EU-27) whereas impacts on production are negligible. Furthermore scenario EXPIRY-NOSUB, corrected for the impacts of REF-NOSUB, gives very similar impacts as EXPIRY on prices (-8.4% - (-0.5%) = -7.9%) and production (-2.9%).

The final columns present the results on the sensitivity analysis with respect to quota rents. The impacts shown are against the reference run with higher quota rents REF-HIGH which is omitted from the tables because results are nearly identical to REF. In fact this reference run has been set up to basically give the same price - quantity framework except for the parameters of behavioural functions reflecting higher quota rents. This permits an isolated comparison with the results following from a strong increase of initial quota rents (+75%, cut of at +15 percentage points). As may be expected considerably higher quota rents would give markedly stronger impacts. The production increase of the EU-15 would double whereas the differences are lower at the EU-27 level (+5.7% vs. +3.1%), as the rents for the EU-12 (mostly equal to zero) have not been modified in the sensitivity analysis. Price changes would strongly increase as well such that we would have projected a decline of 13.6% on the EU-27 level with high rents against 7.3% with default, i.e. likely rents. In Spain, prices could even drop by 36%. It is quite clear that the sensitivity analysis goes beyond the range of quota rents expected under most circumstances. However the impact of an increase of quota rents of 25% is likely to be close to a linear interpolation between EXPIRY and EXPIRY-HIGH with a weight of one third for EXPIRY-HIGH such that large variation results are also informative for more moderate modifications of initial assumptions.

Increased availability of raw milk would translate into additional production of dairy products, giving an increase of 6.8% for 'Butter' on the EU-27 level (Table 28). Prices and therefore demand are hardly affected, as EU market management is assumed to use export subsidies to maintain the ratio of market prices to intervention prices approximately at historical values. With basically unchanged demand the quota expiry would turn the EU-27 from a net importer to a net exporter of 'Butter' by 2020. Aggregate net exports from the EU-10 would increase. Differences in price impacts between MS are similar to the corresponding analysis for 2014. Abolishing export subsidies has only a small impact for prices (-1.2% for EU-27) but the price drop in the EU-27 under EXPIRY-NOSUB relative to REF-NOSUB is clearly stronger than under the standard EXPIRY scenario (5.5 - 1.2 = 4.3% > 0.6%). By implication, if export subsidies prevent 'Butter' prices to drop stronger they indirectly contribute to the production increase of +6.8%. 'Butter' production would have increased by 5% only without export subsidies as may be calculated from the difference of impacts under scenarios EXPIRY-NOSUB and REF-NOSUB (5.0% = 4.7% - (-0.3%)).

Finally, Table 28 shows that the production increase for 'Butter' would be even larger (+12.3%) if quota rents had been higher. The sensitivity analysis is also illuminating for the strength of EU market management: to limit the decline of 'Butter' prices to 0.4%, even under EXPIRY-HIGH, Commission market management is assumed to increase the average subsidy to 1835 €/t, accepting an increase of export subsidy outlays for 'Butter' from 151 million € to 566 million € (comp. Table 35). This is still below the current WTO limit (948 million €) but nonetheless may be considered unlikely as it would contradict the Commission strategy for further market orientation in all areas of the CAP.

Table 27: Market results for quota expiry related scenarios: Cow milk, 2020 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				REF-NOSUB				EXPIRY-NOSUB				EXPIRY-HIGH			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	252	3201	3039	162	-14.9	6.2	6.5	0.4	-0.6	0.0	0.0	0.0	-16.1	5.9	6.2	0.4	-23.4	9.3	9.8	0.5
Belgium-Lux.	260	3402	3466	-64	-12.4	8.2	8.0	-0.7	-0.7	0.0	0.0	0.0	-14.1	7.7	7.5	-0.8	-20.8	13.3	13.0	-1.1
Denmark	268	4732	4745	-13	-6.6	1.3	1.3	0.5	-0.7	0.0	0.0	-0.2	-8.3	0.9	0.9	0.0	-14.2	4.0	4.0	-0.8
Finland	301	2547	2546	1	-5.7	1.5	1.5	-7.8	-0.5	0.0	0.0	-0.1	-6.7	1.3	1.3	-8.2	-8.4	1.0	1.0	-25.8
France	289	25921	25395	526	-6.7	2.1	2.2	-0.1	-0.6	0.0	0.0	0.0	-8.0	1.8	1.9	0.0	-16.4	7.2	7.3	0.4
Germany	303	30471	30073	399	-6.4	3.0	3.0	-0.2	-0.5	0.0	0.0	0.0	-7.5	2.6	2.7	-0.1	-8.9	2.5	2.6	-0.8
Greece	267	918	959	-40	-10.3	1.0	1.0	-0.1	-0.5	0.0	0.0	0.0	-10.6	1.0	0.9	-0.1	-15.8	0.8	0.7	-0.1
Ireland	253	5374	5662	-288	-6.4	4.8	4.6	0.0	-0.6	0.0	0.0	0.0	-8.0	4.5	4.2	0.0	-12.6	9.9	9.4	0.0
Italy	308	11647	12861	-1214	-8.7	2.7	2.5	0.0	-0.4	0.0	0.0	0.0	-9.4	2.6	2.3	0.0	-21.2	8.7	7.9	-0.2
Netherlands	324	11043	11541	-499	-9.1	10.7	10.2	-0.1	-0.3	0.0	0.0	0.0	-9.8	10.6	10.1	-0.1	-16.6	19.7	18.8	-0.2
Portugal	290	2145	2125	20	-2.6	-1.2	-1.2	-1.2	-0.3	-0.1	-0.1	0.0	-3.4	-1.4	-1.4	-1.2	-13.2	5.3	5.4	0.0
Spain	306	6532	6482	51	-19.5	11.0	11.0	4.1	-0.4	0.0	0.0	0.0	-20.0	10.7	10.8	3.9	-36.4	20.9	21.0	8.9
Sweden	307	3319	3214	105	-3.0	-0.8	-0.8	-0.3	-0.4	-0.1	-0.1	0.0	-4.3	-1.1	-1.1	-0.3	-5.5	-1.3	-1.4	-0.6
United Kingdom	296	15106	14809	297	-2.5	-1.0	-1.0	-0.5	-0.3	-0.1	-0.1	0.0	-3.4	-1.4	-1.4	-0.6	-4.7	-1.5	-1.6	-1.1
EU15	295	126358	126916	-558	-7.4	3.4	3.4	-0.1	-0.5	0.0	0.0	0.0	-8.5	3.1	3.1	-0.1	-14.5	6.8	6.7	-0.7
Cyprus	332	155	156	0	-2.2	-0.8	-0.8	5.3	-0.2	-0.1	0.0	0.3	-2.5	-0.9	-0.8	6.2	-4.0	-1.5	-1.4	10.2
Czech Republic	226	2773	2700	73	-5.3	0.3	0.3	-0.2	-0.7	0.0	0.0	0.0	-6.7	-0.1	-0.1	-0.1	-8.0	-0.6	-0.6	-0.5
Estonia	219	649	667	-19	-3.4	-1.0	-0.9	0.3	-0.5	-0.1	-0.1	0.0	-4.8	-1.2	-1.1	0.3	-6.3	-1.7	-1.6	0.6
Hungary	244	1969	1938	31	-3.7	-0.6	-0.6	-0.5	-0.4	0.0	0.0	0.0	-4.5	-0.6	-0.6	-0.5	-6.5	-1.1	-1.1	-1.0
Latvia	187	838	841	-3	-3.1	-0.4	-0.4	2.3	-0.5	-0.1	-0.1	0.0	-4.4	-0.6	-0.5	2.2	-5.5	-0.8	-0.7	4.5
Lithuania	178	1801	1739	61	-2.8	-0.8	-0.8	-0.3	-0.4	-0.1	-0.1	0.0	-4.0	-1.0	-1.0	-0.3	-5.1	-1.4	-1.5	-0.6
Malta	286	41	40	1	-5.8	-0.6	-0.6	-0.1	-0.4	-0.1	-0.1	0.0	-6.6	-0.7	-0.7	-0.1	-10.2	-1.1	-1.1	-0.3
Poland	220	11603	11566	37	-10.8	3.5	3.5	2.8	-0.7	0.0	0.0	0.1	-11.9	3.1	3.1	2.9	-12.6	2.6	2.6	-0.6
Slovac Republic	244	986	1101	-115	-3.5	-0.6	-0.5	0.1	-0.6	-0.1	0.0	0.0	-4.9	-0.7	-0.7	0.1	-6.2	-1.1	-0.9	0.2
Slovenia	231	669	649	20	-3.0	-0.7	-0.7	-0.3	-0.6	-0.1	-0.1	0.0	-4.2	-0.9	-0.9	-0.3	-5.3	-1.3	-1.3	-0.6
EU10	221	21483	21397	86	-7.7	1.7	1.7	0.3	-0.6	0.0	0.0	0.1	-8.8	1.4	1.4	0.4	-9.8	0.9	0.9	-2.2
Bulgaria	156	1270	1270	0	-6.3	0.8	0.8	-27.1	-0.5	0.0	0.0	0.7	-7.1	0.7	0.7	-33.9	-9.1	-0.1	-0.1	-125.7
Romania	180	4662	4661	0	-4.5	2.7	2.7	-162.6	-0.3	0.0	0.0	-9.3	-5.0	2.6	2.7	-197.1	-5.0	2.1	2.2	-506.4
EU02	175	5932	5932	0	-4.8	2.3	2.3	-114.8	-0.4	0.0	0.0	-5.8	-5.3	2.2	2.2	-139.5	-5.7	1.7	1.7	-372.8
EU27	280	153773	154245	-472	-7.3	3.1	3.1	-0.1	-0.5	0.0	0.0	0.0	-8.4	2.9	2.8	-0.1	-13.6	5.7	5.7	-0.2

Table 28: Market results for quota expiry related scenarios: Butter, 2020 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				REF-NOSUB				EXPIRY-NOSUB				EXPIRY-HIGH			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	3104	28	38	-10	-0.8	14.6	0.0	-41.1	-1.2	-0.2	0.0	0.5	-5.8	12.7	0.1	-35.2	-1.2	21.7	0.0	-61.0
Belgium-Lux.	2543	115	106	9	-0.5	9.9	0.0	131.9	-1.3	0.0	0.0	-0.7	-6.0	9.0	0.1	118.5	-0.8	16.3	0.0	217.3
Denmark	3267	93	102	-10	-0.5	3.9	0.0	-36.4	-1.2	-0.2	0.0	1.8	-5.4	2.1	0.1	-19.1	-1.2	9.7	0.0	-91.3
Finland	2481	44	34	10	-0.3	2.7	0.0	12.1	-1.3	-0.1	0.1	-0.8	-5.8	1.7	0.3	6.4	-0.4	2.1	0.0	9.2
France	3939	384	469	-85	-0.5	6.4	0.0	-28.6	-0.9	-0.2	0.2	2.1	-4.4	4.6	1.1	-14.6	-1.3	18.7	0.2	-84.0
Germany	2818	400	499	-99	-0.5	7.5	0.1	-30.0	-1.3	-0.4	0.7	5.4	-5.8	4.6	3.5	-1.0	-0.7	7.4	0.0	-29.9
Greece	4807	2	9	-7	-0.1	1.7	0.0	-0.4	-0.8	-0.6	0.2	0.5	-3.4	-1.2	1.1	1.7	-0.2	2.1	0.0	-0.5
Ireland	3090	128	16	111	-0.2	8.0	0.0	9.2	-1.2	-0.1	0.0	-0.2	-5.4	6.6	0.2	7.5	-0.3	16.0	0.0	18.4
Italy	3038	124	168	-44	-0.4	4.7	0.1	-12.8	-1.2	-0.2	0.3	1.6	-5.5	3.4	1.3	-4.7	-0.9	14.6	0.2	-40.1
Netherlands	2375	158	74	84	-0.4	12.8	0.0	24.0	-1.3	-0.4	0.1	-0.7	-5.9	11.2	0.4	20.5	-0.7	23.7	0.1	44.4
Portugal	3255	20	16	5	-0.1	-1.2	0.0	-5.4	-1.1	-0.7	0.2	-3.7	-4.9	-4.0	1.0	-20.5	-0.6	9.0	0.1	38.6
Spain	2307	44	40	4	-1.0	12.7	0.4	147.9	-1.2	-0.7	0.4	-12.5	-6.2	9.4	2.3	86.4	-1.7	24.2	0.6	283.5
Sweden	3026	38	35	3	-0.1	-1.5	0.0	-17.5	-1.2	-0.7	0.1	-8.8	-5.2	-4.2	0.5	-54.3	-0.2	-2.3	0.0	-26.8
United Kingdom	2357	88	178	-91	-0.1	-1.5	-0.1	1.3	-1.3	-1.0	0.5	1.9	-5.5	-5.3	2.4	9.8	-0.3	-1.2	-0.1	0.9
EU15	3048	1666	1785	-120	-0.6	6.9	0.0	-95.1	-1.1	-0.3	0.4	9.7	-5.4	4.8	1.7	-40.8	-0.6	13.4	0.1	-185.2
Cyprus	4322	0	1	-1	-0.1	-1.5	0.0	0.4	-0.9	-1.2	0.2	0.5	-3.8	-6.6	0.9	2.6	-0.2	-1.8	0.0	0.5
Czech Republic	2578	52	42	11	-0.3	1.3	0.0	6.2	-1.3	-0.1	0.3	-1.6	-5.7	0.0	1.5	-5.5	-0.4	0.4	-0.1	2.0
Estonia	2288	6	5	1	-0.2	-0.2	0.1	-1.9	-1.2	-0.6	0.5	-8.4	-5.3	-3.1	2.5	-42.9	-0.3	-0.1	0.2	-2.1
Hungary	2683	5	9	-4	-0.2	0.8	0.1	-0.8	-1.3	-0.8	0.3	1.7	-5.5	-3.5	1.5	8.3	-0.4	1.5	0.2	-1.5
Latvia	1949	8	6	2	-0.1	-0.5	-0.1	-1.9	-1.2	-0.4	0.5	-3.2	-5.4	-2.4	2.5	-17.7	-0.2	-1.3	-0.2	-4.9
Lithuania	2224	11	7	4	0.0	-2.3	0.0	-5.9	-1.2	-1.7	0.5	-5.0	-5.0	-9.6	2.4	-27.7	-0.1	-4.3	0.0	-10.8
Malta	3541	0	0	0	-0.2	0.0	-0.1	-0.1	-1.1	0.0	0.1	0.2	-4.7	0.0	0.5	0.6	-0.3	0.0	-0.2	-0.2
Poland	2038	129	111	18	-0.8	11.5	0.5	78.6	-1.3	-0.1	0.5	-3.4	-6.1	9.5	2.9	49.9	-0.9	9.3	0.4	63.2
Slovac Republic	2548	10	9	1	-0.2	-0.2	0.1	-1.9	-1.3	-0.2	0.5	-4.3	-5.4	-1.5	2.4	-25.2	-0.3	-0.5	0.1	-4.0
Slovenia	2527	4	2	2	0.0	-3.3	0.0	-6.3	-1.3	-0.2	0.5	-0.8	-5.3	-4.7	2.1	-11.0	0.1	-5.9	0.0	-11.3
EU10	2225	227	192	34	-1.0	6.7	0.3	42.4	-1.3	-0.2	0.4	-3.8	-6.3	4.6	2.4	16.5	-1.0	5.0	0.2	31.8
Bulgaria	2151	7	8	-1	-0.3	1.7	0.1	-11.3	-1.3	-0.4	0.5	7.2	-5.6	-0.8	2.4	25.0	-0.3	-0.3	0.0	2.0
Romania	2266	8	13	-5	-0.2	-0.3	0.1	0.8	-1.3	-0.6	0.8	2.9	-5.5	-3.3	3.9	14.2	-0.1	-6.5	0.0	9.4
EU02	2211	15	21	-6	-0.2	0.6	0.1	-1.1	-1.3	-0.5	0.7	3.5	-5.6	-2.1	3.3	15.9	-0.3	-3.5	0.0	8.3
EU27	2944	1907	1999	-92	-0.6	6.8	0.1	-139.6	-1.2	-0.3	0.4	14.3	-5.5	4.7	1.8	-58.1	-0.4	12.3	0.1	-252.2

The quota expiry would also increase EU-27 production of 'Skimmed milk powder' strongly by 2020 (+8.9%, see Table 29). As export subsidies would be zero here, this causes prices to drop markedly (-5.2%) which in turn stimulates demand (+2.5%). Net imports of the EU-27 would decline by more than 50% (- 49000 t) while net exports of the EU-10 would increase, which is almost entirely due to Poland. Price drops tend to be high in MS with strongly increasing production like Austria, Belgium, Spain and Poland. Note that the decline of the EU-10 average price is influenced by an increasing weight for Poland (comp. Footnote 33). The export subsidies (for 'Butter') have only a negligible impact on 'Skimmed milk powder' prices but due to the complementarity in production[34], 'Skimmed milk powder' production slightly decreases under REF-NOSUB. Complementarity to 'Butter' can also explain why production increases less without subsidies: Table 28 shows a smaller impact on 'Butter' production of EXPIRY-NOSUB relative to EXPIRY which will also cause smaller impacts on 'Skimmed milk powder' production under EXPIRY-NOSUB if 'Butter' and 'Skimmed milk powder' are complementary. As may be expected most impacts are becoming more pronounced with higher quota rents under EXPIRY-HIGH.

Table 30 shows again a smaller production increase for 'Cheese' in the EU-27 (+2.4%) than for industrial products. As a consequence price changes are smaller than for 'Skimmed milk powder'. As in the analysis for 2014, The Netherlands would see the strongest price cuts and expansion. Increasing production in most competitive MS of the EU-15 may be seen to displace production in France, Denmark, Portugal, Sweden, UK, and most members of the EU-12. The impacts of export subsidies (for 'Butter') on 'Cheese' are negligible as in most countries there are no particular technological complementarities between 'Butter' and 'Cheese' in addition to the fat and protein balances. The stimulation of EU demand through declining prices partly compensates the increase in supply such that EU-27 net exports only increase by 27%. The sensitivity analysis EXPIRY-HIGH shows most impacts being scaled up against scenario EXPIRY, often in an order of magnitude similar to the variation in quota rents (+75%).

Table 31 confirms the qualitative ranking of impacts obtained for 2004 and 2014: fresh milk products show the smallest increase in production (+0.9% for the EU-27). This also triggers the smallest price drop in the EU-27, -1.8% (apart from policy controlled 'Butter'). As in 2014 the production increase would mainly originate in Austria, Belgium-Luxembourg, Spain, and Poland whereas other countries are expected to be stable or to decrease their production. Again we see that the average price calculation in the EU-10 is strongly influenced by the increasing share for Poland, which has the second lowest prices among all EU-10 members according to the CAPSIM database.

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[34] As mentioned in Subsection 2.2.2, this is partly due to the fat and protein balances and partly due to the typical production programme in many dairy plants.

Table 29: Market results for quota expiry related scenarios: Skimmed milk powder, 2020 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				REF-NOSUB				EXPIRY-NOSUB				EXPIRY-HIGH			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	2261	5	3	2	-5.5	20.6	1.1	51.1	0.0	-0.2	0.0	-0.4	-4.4	18.5	0.8	46.2	-9.2	32.0	1.8	79.2
Belgium-Lux.	2149	68	57	11	-5.1	18.1	1.9	100.1	0.0	0.0	-0.1	0.2	-4.1	16.7	1.3	94.5	-8.8	30.4	3.4	167.6
Denmark	2223	19	12	7	-4.4	5.7	4.4	7.9	0.0	-0.6	-0.5	-0.7	-3.3	2.7	2.7	2.7	-8.0	15.9	9.3	26.6
Finland	2281	20	24	-5	-4.4	3.3	2.7	-0.1	0.0	-0.4	-0.2	0.4	-3.3	1.4	1.6	2.1	-7.5	3.1	4.3	9.1
France	2089	146	173	-26	-5.0	4.6	0.2	-24.1	0.0	-0.3	-0.4	-1.1	-3.9	3.3	-0.7	-23.1	-9.5	17.8	0.2	-97.5
Germany	2146	183	136	48	-4.8	7.1	1.8	22.2	0.0	-0.6	-0.5	-0.6	-3.7	4.5	0.6	15.8	-8.2	7.3	3.4	18.4
Greece	2225	0	2	-2	-4.3	0.0	0.5	0.5	0.0	0.0	-0.3	-0.3	-3.3	0.0	-1.0	-1.0	-7.6	0.0	1.4	1.4
Ireland	2228	54	23	31	-4.4	4.6	1.9	6.7	0.0	-0.3	-0.1	-0.4	-3.4	4.2	1.2	6.4	-7.8	12.6	3.6	19.3
Italy	2230	0	103	-102	-4.3	0.0	2.1	2.1	0.0	0.0	-0.3	-0.3	-3.3	0.0	1.5	1.5	-7.6	0.0	4.0	4.1
Netherlands	2148	46	152	-106	-4.7	15.7	5.7	1.2	0.0	-1.2	-0.5	-0.2	-3.6	11.0	4.8	2.0	-8.2	30.1	9.6	0.6
Portugal	2255	6	11	-5	-4.1	-1.9	3.1	9.0	0.1	-0.9	-0.2	0.7	-3.0	-5.6	2.0	11.0	-8.3	21.8	6.6	-11.3
Spain	2227	7	17	-10	-6.3	64.2	3.2	-43.6	0.0	0.1	-0.1	-0.3	-5.3	62.5	2.5	-43.6	-11.3	122.9	5.9	-84.0
Sweden	2292	23	31	-8	-4.2	1.0	2.4	6.5	0.1	-0.8	-0.1	1.9	-3.0	-2.3	1.4	12.5	-7.5	2.5	4.3	9.9
United Kingdom	2387	63	79	-16	-3.8	-2.4	0.7	13.0	0.1	-0.5	-0.1	1.6	-2.8	-4.2	0.3	17.6	-6.8	-3.9	1.3	21.4
EU15	2179	642	823	-181	-4.8	7.5	2.3	-16.3	0.0	-0.5	-0.3	0.1	-3.7	5.4	1.4	-12.9	-8.6	14.8	4.0	-34.2
Cyprus	2859	0	0	0	-3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-2.6	0.0	0.0	0.0	-5.9	0.0	0.0	0.0
Czech Republic	1868	25	4	21	-4.7	2.6	3.8	2.4	0.0	-0.2	-0.3	-0.2	-3.6	-0.1	2.1	-0.5	-8.2	1.3	6.8	0.2
Estonia	1639	10	3	6	-4.5	0.1	9.7	-5.0	0.0	-0.3	-0.5	-0.2	-3.4	-1.1	6.9	-5.4	-7.9	1.6	17.7	-7.0
Hungary	1962	3	1	1	-4.2	-3.3	3.8	-13.2	0.0	-0.5	-0.3	-0.9	-3.1	-5.7	2.2	-16.8	-7.5	-5.3	6.9	-22.5
Latvia	2136	1	0	1	-4.4	-7.3	-0.1	-9.8	0.0	-0.5	-0.1	-0.7	-3.3	-8.1	-0.1	-10.9	-7.7	-11.8	-0.1	-15.8
Lithuania	1801	8	1	7	-4.7	-2.2	0.0	-2.5	0.0	-0.6	0.0	-0.7	-3.6	-4.2	0.0	-4.7	-8.2	-2.5	0.0	-2.8
Malta	2462	0	3	-2	-3.9	0.0	3.1	3.2	0.0	0.0	-0.1	-0.1	-3.0	0.0	2.3	2.3	-6.9	0.0	5.6	5.7
Poland	1495	91	30	62	-4.9	25.1	9.8	32.5	0.0	-0.1	-0.1	0.0	-3.8	21.6	7.6	28.3	-8.3	24.5	16.8	28.1
Slovac Republic	1875	7	6	1	-4.2	-1.4	3.9	-28.7	0.0	-0.4	-0.5	0.3	-3.1	-2.6	2.3	-27.9	-7.4	-1.8	7.1	-47.9
Slovenia	1866	2	0	2	-4.7	-1.7		-1.7	0.0	-0.6		-0.6	-3.6	-5.4		-5.4	-8.2	-2.3		-2.3
EU10	1620	146	48	98	-5.7	15.8	7.8	19.8	0.0	-0.2	-0.2	-0.2	-4.6	12.8	5.8	16.2	-9.1	15.2	13.5	16.0
Bulgaria	1508	11	15	-4	-4.7	1.9	0.6	-2.5	0.0	-0.6	-0.1	1.1	-3.5	-1.1	0.2	3.6	-8.1	1.8	3.1	6.6
Romania	2543	2	6	-4	-3.8	-1.6	3.3	6.5	0.1	-1.0	-0.3	0.3	-2.8	-5.6	2.4	7.6	-6.7	-5.5	5.5	12.6
EU02	1702	13	21	-8	-4.8	1.2	1.4	1.8	0.0	-0.7	-0.2	0.7	-3.7	-1.9	0.9	5.5	-8.4	0.4	3.8	9.5
EU27	2069	802	892	-91	-5.2	8.9	2.5	-53.8	0.0	-0.4	-0.3	0.4	-4.1	6.7	1.6	-43.0	-8.7	14.6	4.5	-84.8

Table 30: Market results for quota expiry related scenarios: Cheese, 2020 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				REF-NOSUB				EXPIRY-NOSUB				EXPIRY-HIGH			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	5283	158	193	-34	-3.1	5.7	0.6	-22.7	-0.1	0.0	0.0	-0.1	-3.2	5.3	0.6	-21.0	-5.4	8.0	1.1	-30.9
Belgium-Lux.	3215	77	267	-190	-2.8	6.3	0.9	-1.3	-0.1	0.0	0.0	0.0	-2.9	5.7	0.9	-1.1	-5.1	10.0	1.7	-1.7
Denmark	4885	386	163	223	-2.6	-0.2	0.6	-0.7	-0.1	0.1	0.0	0.1	-2.7	-0.1	0.6	-0.5	-4.8	0.8	1.1	0.6
Finland	3794	124	109	15	-2.8	1.8	1.1	6.9	-0.2	0.2	0.0	1.5	-3.0	2.2	1.1	10.6	-4.9	0.9	2.0	-7.4
France	5606	2079	1684	395	-2.2	-0.4	1.0	-6.2	-0.1	0.0	0.0	0.2	-2.3	-0.2	0.9	-5.0	-4.1	0.8	1.9	-3.6
Germany	3685	2039	1919	121	-2.9	2.9	0.9	33.4	-0.1	-0.1	0.0	-0.7	-3.0	2.1	0.8	22.0	-5.1	2.4	1.7	13.4
Greece	6448	252	334	-82	-1.9	0.2	0.9	3.0	-0.1	0.0	0.0	-0.2	-2.0	0.3	0.9	2.5	-3.4	-0.4	1.7	8.0
Ireland	5673	163	37	125	-2.3	2.5	0.7	3.0	-0.1	0.1	0.0	0.2	-2.4	2.8	0.6	3.4	-4.1	5.2	1.2	6.4
Italy	5596	1296	1385	-89	-2.5	2.7	0.7	-29.0	-0.1	0.1	0.0	-1.0	-2.6	2.8	0.6	-29.9	-4.9	8.7	1.3	-105.7
Netherlands	3911	744	413	330	-3.3	12.8	1.3	27.2	-0.2	0.2	0.0	0.5	-3.5	13.4	1.2	28.5	-6.0	23.5	2.3	50.1
Portugal	5244	87	126	-39	-2.3	-1.3	1.1	6.5	-0.1	0.3	0.0	-0.6	-2.5	-0.2	1.1	4.0	-4.8	6.1	2.3	-6.0
Spain	5235	356	508	-152	-3.2	11.9	1.2	-23.7	-0.1	0.2	0.0	-0.6	-3.3	12.2	1.2	-24.7	-5.8	22.0	2.3	-44.0
Sweden	4738	133	202	-70	-2.6	-1.3	0.8	4.7	-0.1	0.0	0.0	0.0	-2.7	-1.1	0.8	4.3	-4.7	-2.7	1.5	9.5
United Kingdom	4768	366	633	-267	-2.4	-3.1	1.1	6.7	-0.2	0.3	-0.1	-0.5	-2.6	-1.5	1.0	4.4	-4.4	-5.8	2.0	12.7
EU15	4844	8261	7976	285	-2.9	2.8	0.9	54.3	-0.1	0.1	0.0	2.1	-2.9	2.8	0.9	56.4	-4.9	5.4	1.7	107.4
Cyprus	7011	12	14	-2	-1.6	-0.9	1.1	14.3	-0.1	0.1	-0.1	-1.0	-1.8	-0.6	1.0	11.1	-3.0	-1.9	2.0	27.5
Czech Republic	4310	156	161	-5	-2.5	0.1	2.4	70.3	-0.1	0.0	0.0	-1.1	-2.5	-0.1	2.3	73.9	-4.4	-0.8	4.3	158.7
Estonia	3864	33	24	9	-2.5	-0.6	2.6	-9.5	-0.1	-0.1	-0.1	-0.2	-2.6	-1.2	2.4	-10.9	-4.5	-1.4	4.8	-18.4
Hungary	4464	83	74	9	-2.4	-0.7	2.0	-24.2	-0.2	0.3	-0.1	3.0	-2.6	0.1	1.9	-15.7	-4.4	-1.8	3.6	-49.1
Latvia	3369	41	37	4	-2.3	-1.5	2.6	-41.5	-0.1	-0.1	0.0	-1.4	-2.3	-1.9	2.5	-44.5	-4.1	-2.9	4.9	-77.9
Lithuania	3004	108	45	64	-2.6	-1.5	4.4	-5.6	-0.1	-0.2	0.0	-0.4	-2.7	-2.2	4.3	-6.8	-4.7	-3.0	8.2	-10.8
Malta	5773	5	11	-6	-2.1	-0.3	1.7	3.6	-0.1	0.0	-0.1	-0.1	-2.2	-0.3	1.5	3.3	-3.9	-0.8	3.2	7.0
Poland	3388	716	569	147	-2.5	0.8	3.5	-9.6	-0.1	-0.1	-0.1	0.1	-2.6	0.4	3.2	-10.5	-4.4	-0.5	6.2	-26.5
Slovac Republic	4378	52	42	10	-2.5	-1.0	2.0	-13.0	-0.1	0.0	0.0	0.2	-2.6	-1.0	1.9	-12.6	-4.5	-2.1	3.6	-25.2
Slovenia	4267	30	26	4	-2.3	-1.0	1.6	-20.1	-0.1	0.0	0.0	0.4	-2.4	-1.0	1.6	-19.9	-4.2	-2.1	3.0	-40.0
EU10	3663	1236	1003	233	-2.5	0.2	3.0	-12.2	-0.1	0.0	-0.1	0.1	-2.5	-0.1	2.8	-12.9	-4.4	-1.1	5.4	-29.0
Bulgaria	3720	76	104	-28	-2.6	-0.9	1.5	8.1	-0.1	0.0	0.0	-0.1	-2.7	-0.9	1.4	7.7	-4.6	-3.8	2.8	20.9
Romania	3947	54	90	-36	-2.6	-0.1	1.7	4.3	-0.1	-0.1	-0.1	0.0	-2.7	-0.6	1.5	4.7	-4.4	-4.3	2.8	13.5
EU02	3814	130	194	-63	-2.6	-0.6	1.6	5.9	-0.1	0.0	0.0	-0.1	-2.7	-0.8	1.5	6.1	-4.5	-4.0	2.8	16.8
EU27	4679	9627	9173	454	-2.7	2.4	1.2	27.0	-0.1	0.0	0.0	1.3	-2.8	2.4	1.1	27.9	-4.7	4.4	2.2	50.2

Table 31: Market results for quota expiry related scenarios: Fresh milk products, 2020 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				REF-NOSUB				EXPIRY-NOSUB				EXPIRY-HIGH			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	755	898	762	135	-2.3	4.6	0.7	26.2	-0.2	0.1	0.0	0.4	-2.7	4.7	0.8	27.0	-3.8	7.3	1.2	41.5
Belgium-Lux.	734	1450	996	453	-1.9	2.2	0.6	5.8	-0.2	0.0	0.0	-0.1	-2.3	2.2	0.6	5.6	-3.2	3.9	1.0	10.2
Denmark	875	740	743	-3	-1.4	-0.6	0.5	227.6	-0.2	0.0	0.0	-1.5	-1.7	-0.3	0.5	180.5	-2.4	-0.7	0.8	325.0
Finland	840	1029	988	42	-1.6	0.6	0.6	2.1	-0.1	-0.1	0.0	-3.2	-1.9	0.0	0.6	-13.1	-2.7	0.8	1.0	-3.1
France	957	6146	5980	166	-1.3	0.1	0.7	-23.5	-0.1	0.0	0.0	-1.1	-1.6	0.1	0.8	-24.9	-2.3	0.9	1.3	-12.3
Germany	538	8651	7984	667	-1.9	0.9	0.6	3.9	-0.2	0.4	0.0	4.7	-2.4	2.6	0.7	25.0	-3.1	0.3	1.0	-8.0
Greece	1123	747	828	-81	-1.1	0.1	0.7	6.9	-0.1	-0.1	0.0	0.6	-1.3	-0.2	0.8	9.7	-1.9	0.6	1.3	7.5
Ireland	940	701	824	-123	-1.2	-2.0	0.6	15.1	-0.2	0.1	0.0	-0.7	-1.5	-1.1	0.7	10.6	-2.0	-3.2	1.0	25.1
Italy	1091	3454	3944	-489	-1.1	-1.3	0.5	13.0	-0.1	-0.1	0.0	0.8	-1.3	-1.6	0.5	15.2	-1.7	-3.3	0.7	29.5
Netherlands	864	1604	2112	-509	-1.5	-0.5	0.6	4.2	-0.1	-0.3	0.0	0.8	-1.7	-1.4	0.6	7.0	-2.5	-0.5	1.1	5.8
Portugal	728	1112	1245	-133	-1.7	-1.0	0.8	15.3	-0.2	-0.3	-0.1	1.9	-2.0	-2.0	0.7	23.1	-3.2	1.7	1.4	-1.1
Spain	739	5274	5836	-562	-2.2	5.0	1.1	-35.8	-0.2	-0.2	-0.1	0.8	-2.5	4.4	1.0	-30.7	-3.9	10.0	1.9	-74.7
Sweden	791	1257	1391	-134	-1.6	-0.5	0.5	9.9	-0.2	-0.1	0.0	1.3	-1.9	-0.8	0.6	13.8	-2.8	-0.3	0.9	12.0
United Kingdom	522	7283	7568	-285	-1.8	0.1	0.4	9.7	-0.2	-0.3	-0.1	6.0	-2.1	-1.1	0.4	37.2	-3.2	0.9	0.8	-2.3
EU15	742	40346	41202	-856	-1.8	0.8	0.7	-8.5	-0.2	0.0	0.0	0.6	-2.1	0.8	0.7	-7.3	-3.0	1.7	1.1	-25.4
Cyprus	933	83	97	-14	-1.4	-0.6	0.3	6.0	-0.1	-0.2	-0.1	0.8	-1.6	-1.2	0.3	9.5	-2.3	-0.7	0.6	8.3
Czech Republic	704	706	743	-37	-1.7	-1.0	0.8	33.4	-0.2	-0.1	-0.1	0.5	-2.0	-1.1	0.8	35.6	-2.8	-1.4	1.3	52.6
Estonia	677	192	182	10	-1.6	-1.5	0.6	-38.5	-0.2	0.1	0.0	3.3	-2.1	-0.4	0.8	-21.7	-2.7	-2.2	1.1	-58.7
Hungary	711	842	848	-6	-1.7	-0.9	0.7	225.7	-0.2	-0.2	-0.1	13.5	-2.0	-1.5	0.6	307.5	-2.9	-1.1	1.2	343.3
Latvia	350	114	71	43	-1.5	-1.5	1.4	-6.5	-0.2	0.3	0.1	0.7	-2.0	0.2	2.1	-2.9	-2.6	-2.1	2.5	-9.8
Lithuania	537	319	339	-20	-1.6	-2.1	0.7	46.3	-0.2	0.2	0.0	-4.4	-2.1	-0.5	0.9	23.3	-2.7	-3.0	1.3	71.2
Malta	653	38	35	3	-1.7	-1.0	0.7	-20.8	-0.2	-0.1	0.0	-2.0	-2.1	-1.2	0.8	-25.5	-2.9	-1.3	1.1	-29.9
Poland	441	4630	4062	568	-2.0	2.8	1.9	8.6	-0.2	0.1	-0.1	1.5	-2.4	3.3	2.1	11.9	-3.1	2.2	3.0	-3.4
Slovac Republic	609	406	297	109	-1.7	-0.8	1.1	-6.1	-0.2	0.0	0.0	0.1	-2.1	-0.6	1.2	-5.6	-2.9	-0.9	1.9	-8.7
Slovenia	694	319	266	53	-1.6	-1.5	0.6	-12.4	-0.2	-0.1	0.0	-0.7	-1.9	-1.8	0.7	-14.1	-2.7	-2.3	1.1	-19.3
EU10	530	7648	6939	709	-2.2	1.2	1.4	-1.0	-0.2	0.1	-0.1	1.2	-2.6	1.6	1.5	1.8	-3.3	0.7	2.3	-14.8
Bulgaria	732	211	206	5	-1.7	-0.8	0.1	-36.0	-0.2	-0.1	0.0	-1.7	-2.1	-0.8	0.1	-38.2	-3.0	-0.7	0.2	-35.0
Romania	555	307	293	14	-1.9	0.2	0.4	-3.3	-0.2	-0.1	-0.1	0.8	-2.2	0.0	0.3	-6.4	-2.9	-1.0	1.0	-42.3
EU02	627	518	499	19	-1.9	-0.2	0.3	-12.5	-0.2	-0.1	-0.1	0.1	-2.2	-0.3	0.3	-15.3	-2.9	-0.9	0.7	-40.3
EU27	708	48512	48640	-128	-1.8	0.9	0.8	-49.2	-0.2	0.0	0.0	-2.9	-2.2	0.9	0.8	-56.0	-3.0	1.5	1.3	-81.5

There are small indirect impacts of export subsidies for 'Butter' on fresh milk prices (-0.2% under REF-NOSUB) which are likely to run through the milk fat balance. Higher quota rents would evidently magnify all impacts under EXPIRY-HIGH.

The impact of a quota expiry on the 'Beef' market (Table 32) appears to be small at the EU-27 level, but it is sizeable in The Netherlands due to a very low suckler cow herd (compare Subsection 4.2.2). In The Netherlands it appears that availability of calves and meat from cows are the main linkages to 'Beef' production, giving a complementary relationship. In some EU-10 MC competition for 'Fodder' seem to be the dominating relationship because production of 'Beef' is clearly increasing, in particular in the Baltic countries. This may be facilitated by the common use of dual purpose brands in the NMS rather than having specialised dairy and 'Beef' herds. Note that the price impacts are slightly influenced by EU market management which would increase export subsidies by about 1 €/t.

Changes in milk production would usually imply some increase in 'Fodder' prices and production in the same direction (Table 33). It may be interesting to investigate why the impact on 'Fodder' prices is so strong in The Netherlands while for many other impacts Spain shows similar or even higher changes (compare also Table 20 above). The key difference for this question is the importance of the dairy sector for total feed demand. Whereas in The Netherlands about 50% of all feed energy is used for dairy cows this percentage is only 15% in Spain such that the same percentage changes in the dairy sector cause much stronger repercussions in the feed sector of The Netherlands than in Spain. Columns REF-NOSUB show that export subsidies slightly increase 'Fodder' prices through increased demand from the animal sector. Finally columns EXPIRY-HIGH confirm that impacts on the fodder sector, as all others, are reinforced with higher quota rents.

Table 34 shows the impacts on cereal markets. Increasing milk production sizeably increases demand which often occurs indirectly through reduced availability of 'Fodder' for other animal types. At the same time there is a moderately decrease in supply through competition with 'Fodder' (on arable land). This reduces net exports from the EU-27 (- 2000000 t) which tends to increase EU border prices and thus also EU market prices, on the EU-27 level by 0.9%. Supply and demand effects differ among countries and are particularly strong in The Netherlands. Indirect impacts of export subsidies on cereal markets through increased feed demand are visible at scenario REF-NOSUB but very small. Finally EXPIRY-HIGH shows the usual amplification of impacts under higher quota rents.

Table 32: Market results for quota expiry related scenarios: Beef, 2020 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				REF-NOSUB				EXPIRY-NOSUB				EXPIRY-HIGH			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	2863	182	142	40	0.0	0.1	-0.2	1.3	-0.3	0.0	0.0	-0.2	-0.7	0.1	-0.1	0.8	-0.1	0.4	-0.4	3.3
Belgium-Lux.	3016	260	204	56	-0.1	2.3	-0.1	11.2	-0.3	0.0	0.0	-0.2	-0.7	2.1	-0.1	10.0	-0.2	3.8	-0.2	18.5
Denmark	1911	111	146	-35	-0.1	1.2	-0.2	-4.7	-0.3	0.0	0.1	0.3	-0.7	0.9	-0.1	-3.2	-0.3	2.9	-0.4	-10.7
Finland	2331	74	92	-19	-0.1	1.1	-0.4	-6.2	-0.3	0.0	0.0	0.1	-0.8	0.9	-0.3	-5.3	-0.1	0.7	-0.7	-6.0
France	3474	1593	1558	35	0.0	-0.2	-0.3	5.4	-0.3	0.0	0.0	0.8	-0.6	-0.2	-0.3	5.0	0.0	-0.2	-0.5	14.4
Germany	2177	1120	919	201	-0.1	0.3	-0.3	3.0	-0.3	-0.1	0.1	-0.8	-0.7	0.1	-0.2	1.7	-0.1	0.7	-0.5	6.2
Greece	4472	46	178	-132	0.0	0.4	-0.5	-0.8	-0.2	0.0	0.1	0.1	-0.4	0.4	-0.3	-0.5	0.0	0.6	-0.9	-1.4
Ireland	2351	520	87	433	0.0	0.6	-0.2	0.7	-0.3	0.0	0.0	0.0	-0.7	0.5	-0.1	0.7	0.0	1.5	-0.4	1.8
Italy	3224	923	1310	-387	0.0	0.8	-0.2	-2.6	-0.3	0.0	0.0	0.0	-0.6	0.7	-0.1	-2.2	-0.1	2.3	-0.4	-6.8
Netherlands	3381	281	328	-47	-0.3	4.5	-0.3	-28.8	-0.3	0.0	0.0	0.4	-0.8	4.4	-0.2	-27.3	-0.5	8.0	-0.5	-51.5
Portugal	3537	101	201	-99	0.0	1.0	-0.3	-1.5	-0.3	0.0	0.0	0.0	-0.6	0.8	-0.2	-1.2	-0.1	1.3	-0.5	-2.4
Spain	2915	627	695	-69	0.0	-0.9	-0.4	4.3	-0.3	0.0	0.1	0.8	-0.6	-0.9	-0.2	6.3	0.0	-1.9	-0.7	10.1
Sweden	2623	125	225	-99	0.0	0.1	-0.2	-0.7	-0.3	0.0	0.0	0.1	-0.7	0.1	-0.2	-0.5	-0.1	0.1	-0.4	-1.1
United Kingdom	3066	719	1178	-458	0.0	-0.5	-0.3	0.1	-0.3	-0.1	0.0	0.0	-0.6	-0.6	-0.2	0.5	0.0	-0.8	-0.5	0.0
EU15	2953	6682	7262	-580	0.0	0.4	-0.3	-7.6	-0.3	0.0	0.0	0.5	-0.6	0.3	-0.2	-5.7	-0.1	0.8	-0.5	-15.7
Cyprus	2636	4	6	-2	-0.1	1.0	0.5	-0.5	-0.3	-0.1	0.0	0.2	-0.7	0.9	0.6	0.0	-0.1	1.8	0.9	-0.9
Czech Republic	1737	86	84	2	-0.2	0.9	-0.7	68.1	-0.3	-0.1	0.1	-6.2	-0.8	0.7	-0.5	52.5	-0.3	1.4	-1.2	115.7
Estonia	1408	17	15	2	-0.2	1.9	-0.4	18.3	-0.3	0.1	0.2	-0.5	-0.9	2.0	-0.1	17.1	-0.4	3.1	-0.8	30.9
Hungary	2240	39	39	-1	-0.1	0.8	-0.1	-61.0	-0.3	0.0	0.0	2.5	-0.7	0.6	0.0	-42.8	-0.2	1.0	-0.2	-89.1
Latvia	1660	18	21	-3	-0.4	1.4	-0.6	-12.5	-0.3	-0.1	0.0	0.6	-1.0	1.0	-0.5	-10.0	-0.7	2.1	-1.1	-21.0
Lithuania	1577	42	39	3	-0.4	2.6	0.1	32.3	-0.3	0.0	0.0	0.3	-1.0	2.5	0.3	29.0	-0.7	4.3	0.1	55.0
Malta	2710	1	11	-10	0.0	0.3	-0.7	-0.8	-0.3	-0.1	0.0	0.1	-0.7	0.1	-0.5	-0.6	0.0	0.5	-1.3	-1.5
Poland	1838	319	272	47	-0.3	0.8	-1.0	11.1	-0.3	-0.1	0.0	-0.2	-0.9	0.7	-0.8	9.2	-0.5	1.2	-1.6	17.5
Slovac Republic	2743	37	42	-5	-0.2	0.6	-0.3	-6.3	-0.3	0.0	0.1	0.7	-0.8	0.5	-0.1	-4.3	-0.3	1.0	-0.5	-10.4
Slovenia	2258	50	56	-7	-0.1	0.2	-0.3	-3.8	-0.3	0.0	0.0	0.1	-0.7	0.1	-0.2	-2.5	-0.1	0.2	-0.5	-6.5
EU10	1910	613	586	27	-0.3	0.9	-0.6	34.8	-0.3	0.0	0.0	-1.0	-0.9	0.8	-0.5	28.4	-0.5	1.4	-1.1	56.3
Bulgaria	2513	46	73	-27	-0.1	1.5	-0.1	-2.7	-0.3	0.0	0.0	0.1	-0.8	1.3	0.0	-2.2	-0.2	2.3	-0.1	-4.2
Romania	2144	177	214	-37	-0.2	1.1	0.0	-5.3	-0.4	0.0	-0.1	-0.4	-0.8	1.0	0.1	-4.5	-0.2	1.2	0.0	-6.0
EU02	2220	223	287	-64	-0.2	1.2	0.0	-4.2	-0.4	0.0	-0.1	-0.2	-0.8	1.1	0.1	-3.5	-0.2	1.4	0.0	-5.2
EU27	2846	7518	8135	-617	-0.1	0.4	-0.3	-9.1	-0.3	0.0	0.0	0.5	-0.7	0.3	-0.2	-6.9	-0.1	0.9	-0.5	-17.7

Table 33: Market results for quota expiry related scenarios: Fodder, 2020 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				REF-NOSUB				EXPIRY-NOSUB				EXPIRY-HIGH			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	22	40705	40713	-8	4.2	0.4	0.4	-49.8	0.0	0.0	0.0	2.9	3.9	0.4	0.4	-44.1	10.0	0.6	0.6	-42.2
Belgium-Lux.	22	32444	32446	-2	13.4	0.5	0.5	279.9	-0.2	0.0	0.0	0.2	12.2	0.5	0.5	266.5	19.9	0.7	0.7	333.3
Denmark	37	17324	17329	-5	0.5	0.0	0.0	-50.7	-0.1	0.0	0.0	0.9	0.5	0.0	0.0	-44.9	0.1	-0.1	-0.1	-98.7
Finland	28	9997	9988	9	2.4	0.1	0.1	9.7	-0.1	0.0	0.0	-0.2	2.0	0.1	0.1	9.1	1.9	0.1	0.0	19.5
France	25	295783	295832	-49	4.6	0.2	0.2	-36.3	-0.2	0.0	0.0	0.7	3.8	0.2	0.2	-36.1	12.4	0.6	0.6	-3.9
Germany	26	211096	211096	0	5.2	0.1	0.1	-2890.1	0.2	0.0	0.0	665.8	4.8	0.1	0.1	-2188.2	4.9	0.1	0.1	-12639.5
Greece	32	17971	17970	1	1.7	0.0	0.0	230.1	0.0	0.0	0.0	-11.5	1.6	0.0	0.0	201.3	0.7	0.0	0.0	458.0
Ireland	10	133329	133363	-34	13.9	0.2	0.2	64.4	-0.2	0.0	0.0	-0.6	12.3	0.1	0.2	57.8	33.2	0.5	0.5	151.9
Italy	31	88322	88341	-19	8.3	0.3	0.3	20.3	-0.2	0.0	0.0	-0.3	7.5	0.3	0.3	19.4	16.3	0.7	0.7	49.3
Netherlands	17	55132	55138	-6	75.5	1.7	1.8	1126.2	-1.3	0.0	0.0	-23.0	73.2	1.6	1.7	1114.0	127.9	2.5	2.6	1676.0
Portugal	17	26311	26315	-4	-2.0	-0.1	-0.1	-122.0	-0.4	0.0	0.0	-2.5	-2.8	-0.1	-0.1	-121.6	7.9	0.4	0.3	-66.5
Spain	19	125192	125166	26	15.2	0.0	0.1	-75.5	-0.1	0.0	0.0	-1.0	14.8	0.0	0.1	-79.1	17.7	0.3	0.3	-56.5
Sweden	34	27418	27420	-2	-0.9	0.0	-0.1	-193.3	-0.6	0.0	0.0	-6.3	-2.0	-0.1	-0.1	-202.7	-1.4	-0.1	-0.1	-339.0
United Kingdom	10	265954	265862	91	0.2	-0.1	-0.1	41.4	-0.3	0.0	0.0	0.4	-0.6	-0.1	-0.1	41.8	1.1	-0.1	-0.1	62.5
EU15	21	1346978	1346980	-3	9.1	0.2	0.2	1095.3	-0.2	0.0	0.0	21.2	8.4	0.2	0.2	1098.7	15.9	0.4	0.4	2515.4
Cyprus	41	208	208	0	-2.0	0.0	0.0	2005.6	-0.4	0.0	0.0	38.9	-2.8	0.0	-0.1	2027.8	-4.4	-0.1	-0.1	1878.9
Czech Republic	17	20326	20325	2	1.1	0.0	0.0	136.5	-0.2	0.0	0.0	-0.4	0.6	0.0	0.0	134.3	1.1	0.0	0.0	256.4
Estonia	15	7213	7213	0	-4.4	-0.1	-0.1	523.4	-0.9	0.0	0.0	36.2	-6.7	-0.1	-0.1	616.4	-7.6	-0.1	-0.2	899.4
Hungary	15	20413	20413	0	-3.9	-0.1	-0.1	2542.6	-0.7	0.0	0.0	167.6	-5.0	-0.1	-0.1	2756.5	-5.4	0.0	0.0	4228.3
Latvia	15	6765	6765	1	-2.7	-0.2	-0.3	265.1	-0.5	0.0	0.0	9.7	-3.8	-0.3	-0.3	284.6	-4.7	-0.4	-0.4	449.0
Lithuania	13	20330	20329	1	-2.1	-0.1	-0.1	402.6	-0.5	0.0	0.0	15.4	-3.4	-0.1	-0.1	431.7	-4.1	-0.2	-0.2	665.7
Malta	49	50	50	0	0.1	0.0	0.0	16.2	-2.6	0.0	0.0	6.6	-2.5	-0.1	-0.1	21.0	0.4	0.0	0.0	29.4
Poland	17	69575	69590	-15	0.7	-0.1	-0.1	-61.1	-0.1	0.0	0.0	0.8	0.5	0.0	-0.1	-55.3	2.3	0.0	-0.1	-87.3
Slovac Republic	11	10896	10896	-1	0.0	-0.1	-0.1	-212.6	-0.3	0.0	0.0	-0.1	-0.8	-0.1	-0.1	-206.9	-0.2	-0.2	-0.2	-362.5
Slovenia	29	6071	6067	4	-1.4	0.0	0.0	23.6	-0.4	0.0	0.0	0.5	-2.2	0.0	0.0	23.6	-2.5	0.0	0.0	39.2
EU10	17	161848	161855	-7	-0.4	-0.1	-0.1	-428.6	-0.3	0.0	0.0	-10.4	-0.9	-0.1	-0.1	-435.0	-0.1	-0.1	-0.1	-704.5
Bulgaria	16	15152	15150	2	20.6	0.0	0.1	-272.2	0.0	0.0	0.0	-4.7	18.4	0.0	0.1	-246.8	8.9	0.0	0.0	61.2
Romania	42	73350	73345	5	6.9	0.0	0.0	3.4	-0.1	0.0	0.0	-2.1	6.4	0.0	0.0	-7.1	10.1	-0.1	-0.1	47.5
EU02	37	88501	88495	6	7.9	0.0	0.0	-68.9	-0.1	0.0	0.0	-2.8	7.3	0.0	0.0	-70.1	10.0	0.0	-0.1	50.2
EU27	21	1597327	1597330	-3	8.4	0.2	0.2	222.0	-0.2	0.0	0.0	2.7	7.6	0.1	0.1	213.9	14.4	0.3	0.3	358.2

Table 34: Market results for quota expiry related scenarios: Cereals, 2020 [quantities: 1000 t, prices: €/t]

	REF				EXPIRY				REF-NOSUB				EXPIRY-NOSUB				EXPIRY-HIGH			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Austria	115	4932	5728	-795	1.4	-0.6	2.5	21.5	-0.1	0.0	-0.1	-0.9	1.2	-0.5	2.3	19.8	2.2	-0.8	3.7	31.8
Belgium-Lux.	122	2756	6231	-3475	0.9	-0.7	2.8	5.6	-0.1	0.0	-0.2	-0.3	0.7	-0.7	2.5	4.9	1.4	-1.0	4.9	9.5
Denmark	137	8483	8768	-285	0.9	0.0	0.5	14.1	-0.1	0.0	0.0	-1.4	0.7	0.0	0.3	8.1	1.6	0.0	1.5	44.3
Finland	124	3925	3424	501	1.2	0.0	0.9	-6.2	-0.1	0.0	0.0	0.3	0.9	0.0	0.7	-4.9	1.7	0.0	0.6	-3.7
France	130	65232	33541	31691	0.9	0.0	0.1	-0.2	-0.1	0.0	-0.2	0.2	0.7	0.0	-0.1	0.1	1.4	-0.2	1.0	-1.5
Germany	126	46742	41949	4793	1.0	0.0	1.3	-11.3	-0.1	0.0	-0.1	1.1	0.8	0.0	1.0	-8.7	1.5	0.0	1.1	-9.2
Greece	187	4136	6596	-2460	0.7	0.2	0.0	-0.2	-0.1	0.0	0.0	0.0	0.5	0.1	0.0	-0.2	1.1	0.3	0.0	-0.5
Ireland	112	2401	2974	-572	1.3	-1.3	2.6	19.0	-0.1	0.0	0.0	-0.2	1.1	-1.2	2.3	17.1	2.4	-3.8	5.7	45.5
Italy	166	19213	24614	-5401	0.8	-0.1	0.6	2.7	-0.1	0.0	-0.1	-0.3	0.7	-0.1	0.4	2.2	1.4	-0.2	1.9	9.2
Netherlands	132	1883	8201	-6318	1.1	-7.3	4.0	7.4	-0.1	0.2	-0.1	-0.2	1.0	-7.0	3.8	7.0	1.8	-10.6	8.9	14.7
Portugal	166	1103	4854	-3750	0.8	0.0	-0.3	-0.4	-0.1	0.0	-0.1	-0.1	0.7	0.0	-0.4	-0.5	1.4	0.4	0.5	0.6
Spain	155	19931	30926	-10995	0.9	0.1	0.1	0.2	-0.1	0.0	0.0	0.0	0.7	0.1	0.1	0.2	1.4	0.0	0.2	0.7
Sweden	116	5211	3885	1326	0.8	0.1	-0.5	1.6	-0.1	0.0	-0.1	0.4	0.6	0.1	-0.6	2.2	1.3	0.1	-0.8	2.7
United Kingdom	135	22745	22567	178	0.7	0.1	-0.5	77.4	-0.1	0.0	-0.1	19.3	0.5	0.1	-0.7	106.1	1.1	0.2	-0.8	120.5
EU15	136	208693	204257	4436	0.9	-0.1	0.7	-36.0	-0.1	0.0	-0.1	4.6	0.7	-0.1	0.5	-27.5	1.5	-0.2	1.3	-71.0
Cyprus	215	103	867	-764	0.7	0.1	-0.2	-0.2	-0.1	0.0	-0.1	-0.1	0.6	0.1	-0.3	-0.3	1.1	0.2	-0.3	-0.4
Czech Republic	128	5457	5582	-125	0.8	0.1	-0.1	-7.6	-0.1	0.0	-0.1	-3.8	0.6	0.1	-0.3	-16.6	1.3	0.2	-0.5	-29.0
Estonia	109	754	751	3	0.9	0.2	-0.5	151.8	-0.1	0.0	-0.1	33.7	0.7	0.2	-0.7	201.2	1.4	0.3	-0.9	261.3
Hungary	118	14387	8115	6272	0.9	0.1	-0.2	0.4	-0.1	0.0	-0.2	0.2	0.7	0.1	-0.3	0.6	1.5	0.1	-0.4	0.8
Latvia	106	2266	1224	1042	0.8	0.2	-0.2	0.6	-0.1	0.0	-0.1	0.1	0.6	0.2	-0.3	0.8	1.3	0.3	-0.4	1.1
Lithuania	112	3235	2161	1074	0.8	0.1	-0.6	1.4	-0.1	0.0	-0.1	0.2	0.6	0.1	-0.7	1.8	1.3	0.2	-1.0	2.6
Malta	119	0	178	-177	1.2	0.3	-0.3	-0.3	-0.1	0.4	-0.1	-0.1	0.9	0.7	-0.4	-0.4	1.8	0.4	-0.5	-0.5
Poland	109	29105	30246	-1141	1.1	0.0	1.5	38.7	-0.1	0.0	0.0	-1.3	0.9	0.0	1.3	33.7	1.6	0.1	1.1	27.8
Slovac Republic	119	3258	2759	499	0.9	0.1	-0.1	1.5	-0.1	0.0	-0.1	0.7	0.7	0.1	-0.3	2.4	1.4	0.2	-0.2	2.6
Slovenia	135	579	1055	-476	1.0	0.1	-0.5	-1.1	-0.1	0.0	-0.2	-0.4	0.7	0.1	-0.7	-1.6	1.5	0.2	-0.8	-1.9
EU10	114	59145	52938	6207	1.0	0.1	0.8	-5.8	-0.1	0.0	-0.1	0.7	0.8	0.1	0.6	-4.3	1.5	0.1	0.4	-2.5
Bulgaria	113	6015	5298	718	0.9	0.1	0.1	0.0	-0.1	0.0	0.0	0.2	0.7	0.1	0.0	0.3	1.4	0.2	-0.2	2.9
Romania	148	20840	15872	4968	1.0	0.1	0.8	-2.1	-0.1	0.0	-0.1	0.1	0.8	0.1	0.7	-1.9	1.4	0.2	0.6	-1.2
EU02	140	26855	21170	5685	1.0	0.1	0.6	-1.8	-0.1	0.0	-0.1	0.2	0.8	0.1	0.6	-1.6	1.4	0.2	0.4	-0.6
EU27	132	294693	278364	16328	0.9	0.0	0.7	-12.6	-0.1	0.0	-0.1	1.5	0.7	0.0	0.5	-9.7	1.5	-0.1	1.1	-20.5

Market results yield the necessary information to calculate impacts on producers, taxpayers, consumers and finally overall welfare. Taxpayer impacts turn out crucial for the balance of welfare effects. The top part of Table 35 shows that key impacts on EAGGF come through changes in export subsidies, almost exclusively for 'Butter' as mentioned in the discussion above. These would increase by 165 million € to 415 million €, depending on quota rents, whereas they would be zero[35] under REF-NOSUB and EXPIRY-NOSUB. The bottom part shows that losses in (agricultural) tariff revenues are an important second source of losses to EU taxpayers from an expiry of milk quotas. As net imports would decrease for various dairy and non dairy markets imports would decrease as well implying losses in tariff revenues[36] from 167 million € under EXPIRY-NOSUB (where stronger decreasing 'Butter' prices give the smallest net trade impacts) to 277 million € under EXPIRY-HIGH. In sum the total additional burden is estimated to be 356 million € under scenario EXPIRY against REF.

Table 35: Taxpayer impacts in 2020 for quota expiry scenarios

	REF	EXPIRY	REF-NOSUB	EXPIRY-NOSUB	REF-HIGH	EXPIRY-HIGH
	[m €]	[Δ to REF]	[m €]	[Δ to REF-NOSUB]	[m €]	[Δ to REF-HIGH]
Export refunds	366.8	166.4	3.2	-0.1	366.8	396.5
of which:						
Butter	151.3	164.5	0.0	0.0	151.3	414.6
Beef	30.4	0.7	0.0	0.0	30.4	1.4
Pork	32.5	0.5	0.2	0.0	32.5	0.7
Poultry	88.0	1.0	0.1	0.0	88.0	1.3
Eggs	17.1	-0.1	0.0	0.0	17.1	-0.4
Other FEOGA	52233.0	1.0	52233.0	1.4	52233.0	-2.6
FEOGA total	52599.8	167.4	52236.2	1.3	52599.8	393.8
Tariff revenues	1314.0	-188.2	1210.8	-166.5	1314.0	-277.0
of which:						
Butter	162.8	-89.7	127.8	-73.4	162.8	-128.1
Cheese	145.7	-68.9	141.2	-66.2	145.7	-102.0
Poultry	287.9	-8.9	228.5	-9.1	288.0	-11.3
Taxpayer burden	51285.8	355.7	51025.5	167.8	51285.8	670.8

Income losses for agriculture are one of the largest welfare effects and of course the largest contribution comes from losses in revenues from cow milk (Table 36). Cow milk revenues are declining because, on average at least, an increase in production triggers a decrease in prices exceeding the percentage increase in production. The average loss in the EU-27 is about 3% under EXPIRY, 3.3% under EXPIRY-NOSUB, and highest under EXPIRY-HIGH with 5.2%.

Percentage losses tend to be high where the share of revenue from cow milk in sectoral income is high. This share is above 60% in Denmark, Finland, Germany, Ireland and Sweden among EU-15 members which tend to be most affected. Another determinant is the size of the price drop compared to the quantity change which tends to be quite unfavourable in Austria and Belgium-Luxembourg and quite favourable in The Netherlands. Finally other output losses or increases in cost of variable inputs may modify the first two influences. This is

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[35] Table 35 indicates small export subsidies even for those scenarios because, for technical reasons, 'zero' export subsidies had been implemented as unit subsidies of 0.1 €/t., a value that might have been reduced further to avoid lengthy explanations.

[36] Given that CAPSIM only considers trade with the ROW but not with key trading partners individually it has been decided to ignore TRQs and trade preferences altogether. Instead the total ex-post tariff revenues have been allocated based on imports and differences to world prices which assume that TRQs would affect all imports in a similar fashion. Of course this is a simplification.

visible in Ireland, Belgium-Luxembourg, and The Netherlands where increasing cost is behind a large part of the unexplained rest (beyond cow milk).

The overall income effect also includes changes in the opportunity cost for variable labour and capital. The latter is derived from the profit function of agriculture in CAPSIM where it was assumed that variable components of primary factors, the numéraire of the supply system, accounted for 50% of net value added. This primary factor aggregate varies in simulations as other inputs as well and, for consistency, its opportunity cost has to be acknowledged in welfare calculations even though it is usually a fairly small component of agricultural income, except for The Netherlands which is known for quite intensive production and hence also with a high intermediate consumption but also labour and capital cost.

The next Table 37 shows that losses in agriculture would partly finance gains in the dairy industry. These gains occur because cow milk prices are on average dropping stronger than dairy prices, such that their net income increases. Impacts on other processing industry are negligible such that the total impact on producers is basically the net effect of agricultural losses (- 3.2 b €) and gains of the dairy sector (+1.2 b €) to agriculture giving a total loss of about 2.0 b € under EXPIRY, 2.4 b € under EXPIRY-NOSUB, and 3.3 b € under EXPIRY-HIGH.

Finally Table 38 collects the different components needed to calculate the overall welfare impacts, relying on Table 35 for taxpayer impacts, on Table 37 for producer impacts and adding gains in consumer welfare which originate mainly in the dairy sector. At the bottom line there would be losses to society of 298 million € in the EU-27 according to scenario EXPIRY, which decrease to 79 million € under EXPIRY-NOSUB and increase to 315 million € under EXPIRY-HIGH.

The losses under EXPIRY confirm that a liberalisation in a particular sector may lead to welfare losses in a second best context. Scenario EXPIRY-NOSUB shows that the overall welfare losses would have been smaller indeed if export refunds had been abolished and second best effects were limited to the tariff revenue side.

The welfare results in Table 38 are biased downward because CAPSIM is not able to capture the intrasectoral efficiency gains from an equalisation of quota rents to zero across regions and even within regions. Whereas transaction costs to trade quota rights may be low in some countries (Netherlands, UK) they are certainly high in others (France). Empirical studies (e.g. Oskam and Speijers, 1992) have thus shown that a large additional efficiency gain may be reaped from the quota expiry. These gains cannot be captured by aggregate modelling at the MS level.

Table 36: Contributions to agricultural income changes in quota expiry scenarios for 2020

	REF				EXPIRY (Δ to REF)					EXPIRY-NOSUB (Δ to REF-NOSUB)					EXPIRY-HIGH (Δ to REF-HIGH)				
	agric. GVA	of which cow milk rev.	labour & capital cost	agric. income (	agric. GVA	of which cow milk rev.	labour & capital cost	agric. income	(%)	agric. GVA	of which cow milk rev.	labour & capital cost	agric. income	(%)	agric. GVA	of which cow milk rev.	labour & capital cost	agric. income	(%)
Austria	1959	776	80	1879	-95.9	-77.7	13.3	-109.1	(-5.8)	-102.9	-84.3	12.4	-115.3	(-6.2)	-154.7	-130.9	15.3	-170.0	(-9.0)
Belgium-Lux.	2100	879	441	1659	-129.8	-46.8	-3.3	-126.4	(-7.6)	-140.2	-60.0	-3.6	-136.6	(-8.4)	-197.8	-91.0	3.0	-200.8	(-11.6)
Denmark	1928	1262	132	1796	-88.2	-68.7	0.5	-88.6	(-4.9)	-102.2	-85.2	0.3	-102.5	(-5.8)	-180.0	-136.3	1.4	-181.4	(-10.1)
Finland	907	949	53	854	-44.2	-32.6	1.1	-45.3	(-5.3)	-48.7	-38.2	1.0	-49.6	(-5.9)	-63.2	-57.3	0.4	-63.6	(-7.5)
France	22284	7479	5322	16962	-497.8	-352.6	-13.5	-484.3	(-2.9)	-576.2	-430.1	-12.0	-564.2	(-3.4)	-1207.9	-780.4	-22.9	-1185.1	(-6.6)
Germany	13130	9130	2473	10657	-565.3	-330.5	19.4	-584.6	(-5.5)	-641.5	-420.2	15.8	-657.3	(-6.2)	-784.4	-608.2	15.2	-799.6	(-7.5)
Greece	8289	245	2615	5673	-50.0	-22.9	2.4	-52.4	(-0.9)	-51.4	-22.7	2.1	-53.5	(-0.9)	-79.5	-37.3	2.2	-81.7	(-1.4)
Ireland	1782	1337	67	1715	-109.9	-26.1	16.8	-126.7	(-7.4)	-126.2	-45.4	15.1	-141.3	(-8.3)	-225.9	-53.6	33.3	-259.1	(-15.0)
Italy	24986	3583	8233	16753	-317.3	-222.1	19.1	-336.4	(-2.0)	-344.1	-238.4	17.6	-361.7	(-2.2)	-717.2	-512.7	54.1	-771.4	(-4.5)
Netherlands	8260	3558	747	7512	-199.0	20.5	124.2	-323.2	(-4.3)	-223.3	1.5	121.9	-345.2	(-4.6)	-308.4	-7.5	208.0	-516.4	(-6.6)
Portugal	2137	621	560	1577	-19.8	-23.8	-1.7	-18.1	(-1.1)	-24.0	-27.1	-2.0	-22.1	(-1.4)	-89.3	-53.4	6.4	-95.7	(-5.8)
Spain	26231	2000	9598	16633	-370.6	-212.8	78.8	-449.3	(-2.7)	-389.6	-218.9	75.4	-465.0	(-2.8)	-713.9	-461.1	65.3	-779.2	(-4.6)
Sweden	994	1032	253	741	-26.6	-38.4	0.9	-27.5	(-3.7)	-36.6	-48.7	1.2	-37.9	(-5.2)	-48.5	-68.6	1.6	-50.1	(-6.8)
United Kingdom	11271	4466	2640	8632	-118.5	-158.1	-14.6	-103.9	(-1.2)	-156.9	-190.7	-18.4	-138.6	(-1.6)	-228.2	-274.3	-40.2	-188.0	(-2.2)
EU15	126257	37319	33215	93043	-2632.9	-1592.5	243.1	-2876.0	(-3.1)	-2963.8	-1908.3	227.0	-3190.8	(-3.5)	-4999.0	-3272.4	343.1	-5342.1	(-5.6)
Cyprus	342	52	140	202	-2.4	-1.5	0.0	-2.4	(-1.2)	-2.6	-1.6	0.0	-2.6	(-1.3)	-4.2	-2.8	0.0	-4.2	(-2.1)
Czech Republic	1188	640	205	983	-32.7	-31.6	1.3	-34.0	(-3.5)	-39.1	-38.4	0.2	-39.3	(-4.1)	-51.2	-53.5	-0.7	-50.5	(-5.1)
Estonia	202	149	63	139	-4.3	-6.2	-0.5	-3.8	(-2.7)	-5.3	-7.5	-0.5	-4.7	(-3.5)	-7.5	-11.2	-0.6	-7.0	(-5.0)
Hungary	1995	510	480	1514	-10.9	-20.5	-1.3	-9.6	(-0.6)	-14.1	-22.2	-1.4	-12.7	(-0.8)	-20.8	-36.3	-3.2	-17.6	(-1.2)
Latvia	384	165	123	261	-2.7	-5.4	0.0	-2.7	(-1.0)	-4.2	-6.8	0.0	-4.2	(-1.6)	-5.2	-9.8	-0.1	-5.1	(-2.0)
Lithuania	640	336	173	467	-7.4	-11.4	-2.3	-5.1	(-1.1)	-10.2	-14.0	-2.4	-7.8	(-1.7)	-13.5	-20.7	-3.8	-9.7	(-2.1)
Malta	48	13	4	44	-0.9	-0.7	0.0	-0.9	(-2.1)	-0.9	-0.8	0.0	-0.9	(-2.2)	-1.5	-1.3	0.0	-1.5	(-3.5)
Poland	5536	2550	1571	3966	-243.6	-196.4	17.2	-260.8	(-6.6)	-261.7	-215.1	14.9	-276.6	(-7.1)	-295.5	-263.3	11.0	-306.5	(-7.7)
Slovac Republic	407	247	35	372	-6.4	-9.8	0.3	-6.7	(-1.8)	-9.0	-12.0	0.5	-9.4	(-2.6)	-11.1	-17.4	0.5	-11.6	(-3.1)
Slovenia	378	155	61	317	-5.2	-5.7	-0.8	-4.4	(-1.4)	-6.5	-6.9	-0.9	-5.6	(-1.8)	-8.9	-10.0	-1.4	-7.5	(-2.4)
EU10	11120	4815	2856	8264	-316.4	-289.5	13.9	-330.3	(-4.0)	-353.6	-325.3	10.3	-363.9	(-4.5)	-419.4	-426.3	1.8	-421.2	(-5.1)
Bulgaria	2289	198	480	1809	-3.7	-10.9	0.8	-4.5	(-0.2)	-6.3	-11.7	0.5	-6.8	(-0.4)	-8.5	-18.2	0.6	-9.1	(-0.5)
Romania	7905	882	2370	5535	-16.8	-16.0	-12.4	-4.4	(-0.1)	-24.0	-17.8	-12.8	-11.2	(-0.2)	-5.1	-24.9	-13.7	8.6	(0.2)
EU02	10194	1080	2850	7343	-20.5	-26.9	-11.6	-8.9	(-0.1)	-30.3	-29.5	-12.3	-18.1	(-0.2)	-13.6	-43.1	-13.1	-0.6	(-0.0)
EU27	147571	43215	38921	108650	-2969.8	-1908.9	245.4	-3215.2	(-3.0)	-3347.8	-2263.1	225.0	-3572.8	(-3.3)	-5432.0	-3741.8	331.9	-5763.9	(-5.2)

Table 37: Changes in income for producer groups in quota expiry scenarios for 2020

	EXPIRY (Δ to REF)				EXPIRY-NOSUB (Δ to REF-NOSUB)				EXPIRY-HIGH (Δ to REF-HIGH)			
	Agriculture	Dairies	Oils/sugar	Producers	Agriculture	Dairies	Oils/sugar	Producers	Agriculture	Dairies	Oils/sugar	Producers
Austria	-109.1	67.3	-0.1	-41.9	-115.3	65.0	-0.1	-50.3	-170.0	101.2	0.0	-68.8
Belgium-Lux.	-126.4	86.8	0.2	-39.5	-136.6	82.6	0.2	-53.8	-200.8	144.3	0.5	-55.9
Denmark	-88.6	12.9	0.0	-75.7	-102.5	10.7	0.0	-91.9	-181.4	50.2	0.1	-131.2
Finland	-45.3	10.7	0.0	-34.5	-49.6	8.8	0.0	-40.8	-63.6	8.1	0.1	-55.4
France	-484.3	98.6	0.4	-385.2	-564.2	97.9	0.6	-465.8	-1185.1	480.1	2.1	-702.9
Germany	-584.6	220.7	1.0	-362.9	-657.3	209.7	0.7	-446.9	-799.6	194.1	2.1	-603.4
Greece	-52.4	8.8	0.0	-43.6	-53.5	7.6	0.0	-45.8	-81.7	7.9	0.1	-73.8
Ireland	-126.7	52.0	0.0	-74.7	-141.3	50.2	0.0	-91.1	-259.1	110.0	0.0	-149.2
Italy	-336.4	118.9	0.1	-217.3	-361.8	111.9	0.1	-249.8	-771.4	416.3	0.1	-355.0
Netherlands	-323.2	198.1	0.3	-124.7	-345.2	192.9	0.2	-152.1	-516.4	381.1	0.6	-134.6
Portugal	-18.1	-8.0	0.2	-25.9	-22.1	-8.8	0.1	-30.7	-95.7	31.0	0.3	-64.3
Spain	-449.3	298.0	0.3	-151.0	-465.0	291.1	0.2	-173.6	-779.2	597.4	0.5	-181.3
Sweden	-27.5	-7.2	0.0	-34.7	-37.9	-6.7	0.1	-44.5	-50.1	-11.7	0.1	-61.7
United Kingdom	-103.9	-20.8	0.2	-124.5	-138.5	-19.5	0.2	-157.9	-188.0	-30.6	0.4	-218.2
EU15	-2876.0	1137.0	2.9	-1736.1	-3190.8	1093.5	2.2	-2095.1	-5342.1	2479.4	7.0	-2855.7
Cyprus	-2.4	-0.7	0.0	-3.2	-2.6	-0.8	0.0	-3.4	-4.2	-1.2	0.0	-5.3
Czech Republic	-34.0	1.1	0.0	-32.8	-39.3	-1.3	0.0	-40.6	-50.5	-6.1	0.0	-56.6
Estonia	-3.8	-2.3	0.0	-6.1	-4.7	-2.2	0.0	-6.9	-7.0	-3.9	0.0	-10.9
Hungary	-9.6	-5.0	0.1	-14.5	-12.7	-5.4	0.1	-18.0	-17.6	-8.7	0.2	-26.2
Latvia	-2.7	-1.0	0.0	-3.7	-4.2	-1.2	0.0	-5.3	-5.1	-1.8	0.0	-6.9
Lithuania	-5.1	-6.2	0.0	-11.4	-7.8	-6.3	0.0	-14.2	-9.7	-11.0	0.0	-20.7
Malta	-0.9	-0.3	0.0	-1.2	-0.9	-0.4	0.0	-1.3	-1.5	-0.6	0.0	-2.1
Poland	-260.8	100.9	0.1	-159.8	-276.6	91.9	0.2	-184.5	-306.5	59.0	0.6	-247.0
Slovac Republic	-6.7	-2.4	0.0	-9.1	-9.4	-2.4	0.0	-11.8	-11.6	-4.3	0.1	-15.8
Slovenia	-4.4	-3.2	0.0	-7.5	-5.6	-3.5	0.0	-9.0	-7.5	-5.5	0.0	-13.0
EU10	-330.3	80.8	0.2	-249.3	-363.9	68.5	0.3	-295.1	-421.2	15.8	0.9	-404.5
Bulgaria	-4.5	-1.9	0.0	-6.4	-6.8	-2.1	0.0	-8.9	-9.1	-5.4	0.0	-14.6
Romania	-4.4	0.4	0.0	-4.0	-11.2	-0.3	-0.1	-11.6	8.6	-4.4	0.0	4.1
EU02	-8.9	-1.5	0.0	-10.4	-18.1	-2.4	-0.1	-20.5	-0.6	-9.9	0.0	-10.5
EU27	-3215.3	1216.3	3.1	-1995.8	-3572.8	1159.6	2.5	-2410.7	-5763.9	2485.4	7.8	-3270.7

Table 38: Overall welfare changes in quota expiry scenarios for 2020

	EXPIRY (Δ to REF)				EXPIRY-NOSUB (Δ to REF-NOSUB)				EXPIRY-HIGH (Δ to REF-HIGH)			
	Producers	Taxpayers	Consumers	Welfare	Producers	Taxpayers	Consumers	Welfare	Producers	Taxpayers	Consumers	Welfare
Austria	-41.9	-8.0	45.5	-4.4	-50.3	-3.8	54.1	0.0	-68.9	-15.1	77.8	-6.1
Belgium-Lux.	-39.5	-11.9	60.6	9.2	-53.8	-5.6	72.1	12.6	-56.0	-22.5	108.2	29.6
Denmark	-75.7	-7.2	33.5	-49.4	-91.9	-3.4	38.8	-56.4	-131.4	-13.6	60.7	-84.3
Finland	-34.5	-5.8	30.3	-10.0	-40.8	-2.7	37.2	-6.3	-55.4	-10.9	51.6	-14.6
France	-385.2	-63.6	305.8	-143.0	-465.8	-30.0	398.6	-97.2	-704.0	-119.9	569.6	-254.3
Germany	-362.9	-76.1	402.8	-36.2	-446.9	-35.9	503.0	20.2	-604.2	-143.6	685.4	-62.4
Greece	-43.6	-6.6	58.3	8.1	-45.8	-3.1	63.7	14.8	-74.4	-12.5	103.8	17.0
Ireland	-74.7	-4.8	16.0	-63.5	-91.1	-2.3	20.2	-73.2	-149.0	-9.0	27.7	-130.3
Italy	-217.3	-53.6	247.5	-23.5	-249.8	-25.3	291.2	16.1	-355.5	-101.1	470.5	13.9
Netherlands	-124.7	-16.6	101.6	-39.8	-152.1	-7.8	117.1	-42.8	-134.9	-31.4	180.4	14.1
Portugal	-25.9	-5.2	33.0	2.0	-30.7	-2.4	39.1	6.0	-64.4	-9.8	64.4	-9.7
Spain	-151.0	-31.7	193.1	10.3	-173.6	-15.0	217.5	28.9	-184.0	-59.9	340.5	96.6
Sweden	-34.7	-10.1	49.0	4.2	-44.5	-4.8	59.5	10.2	-61.8	-19.1	87.4	6.6
United Kingdom	-124.5	-40.1	194.6	30.0	-157.9	-18.9	247.4	70.7	-218.7	-75.6	345.8	51.5
EU15	-1736.1	-341.3	1771.4	-306.0	-2095.1	-161.0	2159.6	-96.5	-2862.6	-643.7	3173.7	-332.5
Cyprus	-3.2	-0.3	3.0	-0.5	-3.4	-0.2	3.5	-0.1	-5.4	-0.6	5.4	-0.7
Czech Republic	-32.8	-2.2	29.4	-5.6	-40.6	-1.0	37.3	-4.3	-56.6	-4.1	51.5	-9.1
Estonia	-6.1	-0.2	5.6	-0.7	-6.9	-0.1	6.9	-0.1	-10.9	-0.4	10.1	-1.2
Hungary	-14.5	-2.1	17.7	1.1	-18.0	-1.0	21.1	2.1	-26.4	-3.9	30.3	0.1
Latvia	-3.7	-0.3	5.0	1.0	-5.3	-0.1	6.5	1.1	-7.0	-0.5	9.1	1.7
Lithuania	-11.4	-0.4	9.8	-2.1	-14.2	-0.2	12.1	-2.3	-20.7	-0.8	17.6	-4.0
Malta	-1.2	-0.1	2.0	0.7	-1.3	-0.1	2.2	0.9	-2.1	-0.2	3.7	1.3
Poland	-159.8	-5.1	145.3	-19.6	-184.5	-2.4	173.9	-13.1	-247.7	-9.7	235.0	-22.3
Slovac Republic	-9.1	-0.9	9.2	-0.7	-11.8	-0.4	12.0	-0.2	-15.8	-1.6	16.5	-1.0
Slovenia	-7.5	-0.7	5.9	-2.3	-9.0	-0.3	7.4	-2.0	-13.1	-1.3	10.4	-4.0
EU10	-249.3	-12.2	232.9	-28.6	-295.1	-5.8	282.9	-18.0	-405.7	-23.0	389.5	-39.2
Bulgaria	-6.4	-0.5	16.9	10.0	-8.9	-0.3	18.9	9.7	-15.0	-1.0	29.1	13.0
Romania	-4.0	-1.6	32.2	26.5	-11.6	-0.8	38.7	26.3	4.0	-3.1	42.7	43.6
EU02	-10.4	-2.2	49.1	36.5	-20.5	-1.0	57.6	36.0	-11.1	-4.1	71.8	56.6
EU27	-1995.8	-355.7	2053.4	-298.1	-2410.7	-167.8	2500.0	-78.5	-3279.3	-670.8	3635.0	-315.1

5 EU ACCESSION SCENARIOS

5.1 DEFINITION OF EU ACCESSION SCENARIOS

In view of the fact that EU accession scenarios are provided in addition to those on dairy, it is proposed to focus on the early accession scenario for Croatia (in 2010) and to assume that accession of the remaining Western Balkan countries would occur somewhat later (in 2015). As holds for dairy policies the full effects of accession will not be visible immediately after the accession year. This holds in particular as direct payments will be phased in gradually over time such that accession scenarios can only reasonably be carried out for 2020. Accession of Turkey has been considered a too complex issue to cover it in this study together with dairy reform and Western Balkan scenarios. It appeared useful to maintain the scenario specification of the 2006 Western Balkan CAPSIM study (ARCOTRASS, 2006) to preserve some comparability although database and certain model characteristics have been updated. Important aspects are:

- phasing in of EU payments according to the schedule agreed with EU-02 (starting with 25% in the first year);
- the SAPS rate is assumed to be 40 €/ha for Croatia, 35 €/ha for Serbia and 30 €/ha for the other countries in the first year after accession. It has been assumed that Western Balkan countries would not be eligible for the sugar payments;
- regarding national top-ups the present policy suggests that probably only Croatia and Serbia would use this opportunity to increase support but that even in these countries it is likely that budgetary problems would limit the top-ups to 15% of the full EU premiums that is half the maximum value;
- for milk quotas the accession negotiations with Romania and Bulgaria essentially resulted in freezing that part of milk production delivered to dairies or directly sold by farmers at the time immediately before accession. On the other hand the subsistence part of milk production which is consumed or fed directly on farm is not subject to the quota. On the contrary it might motivate an additional restructuring reserve in case of a decline. Unless subsistence consumption increases after accession (which is considered unlikely) the introduction of the milk quota system would thus essentially constrain milk production to the level attained under reference run conditions[37];
- financial contributions from the Balkan countries to the EU budget may been estimated to be about 0.65% of GDP, in line with the 2004 data for Poland, Slovakia, and the Baltic countries;

[37] This is somewhat more than in ARCOTRASS (2006) where it was assumed that the quotas were specified in view of production at the time of accession. Here instead it is assumed that the specified quotas would anticipate some 'normal' yield growth as would follow from historical trends. Essentially this means that quotas would become just binding in 2020 with trend estimated yield growth whereas there would be some slack at the time of accession. This is less restrictive than in ARCOTRASS (2006) and also in line with the current strategy to expand quotas in the EU-27. Nonetheless as yield growth may be expected to accelerate after accession, there would still be a constraining impact.

- national border protection will be replaced by Common border policies;
- for price convergence, Equations (16) and (19) from Subsection 2.2.3 apply:
    - standard convergence after a transition period, due to decreased transaction costs is assumed to be 20 % ($\psi_1 = 0.2$);
    - if a price difference is attributed to a tariff, 50% of this tariff driven difference is added to the convergence parameter ($\psi_3 = 0.5$);
    - the quality adjustment factor $\phi_{m,i}$ is a function of net trade (in contrast to the 2006 Western Balkan study).

Because the degree of price adjustment is both highly uncertain and crucial for the results it appears useful to investigate this in another sensitivity analysis, as given by:

- accession impacts under default assumptions for price convergence as explained above (acronym 'WB');
- accession impacts with steering parameters adjusted to permit stronger price convergence (acronym 'WB-CONV', $\psi_1 = 0.3$, $\psi_3 = 0.6$);
- accession impacts with prior expiry of milk quotas (acronym 'WB-EXPIRY').

For additional clarity the different simulations are summarised in Table 39. This table also indicates counterfactual simulations carried out for the base year 2004 that may be considered as ex-post validation because unlike the pure calibration result, these results shed some light on the responsiveness of CAPSIM.

Table 39: Overview on CAPSIM simulations performed in this study

Acronym	**Milk quotas**	**Export subsidies**	**Initial rents**	**2004**	**2014**	**2020**
WB	Legal status quo	Active	Default			☒
WB-CONV	Legal status quo	Active	Default			☒
WB-EXPIRY	EC proposal	Active	Default			☒

Equally scenarios WB and WB-CONV are identical to REF in the table regarding the dairy and export policy assumptions. But evidently they differ in other aspects, as explained in Section 5.1. The same holds for scenario WB-EXPIRY which supplements the standard scenario EXPIRY with specific accession assumptions from Section 5.1.

5.2 RESULTS OF EU ACCESSION SCENARIOS

Apart from the policy characteristics of accession scenarios there is another aspect where an assumption is needed. Both in the reference run situations for 2004 and 2020 there is a certain yield gap for many crops and dairy cows to yields typical for the EU-25. A part of this yield differential is likely to be due to permanent characteristics of the region such as climate and soils, another part will also be due to limited access to input and technology and to higher market risk outside the EU. If these impediments are overcome, yield gaps to the EU-25 are likely to be reduced as a consequence of accession. To describe this catching up process we have assumed, following ARCOTRASS (2006) that the reference situation yield gap would be reduced as follows:

$$\text{Yield (WB, region, 2020)} = \text{Yield (REF, region, 2020)}$$

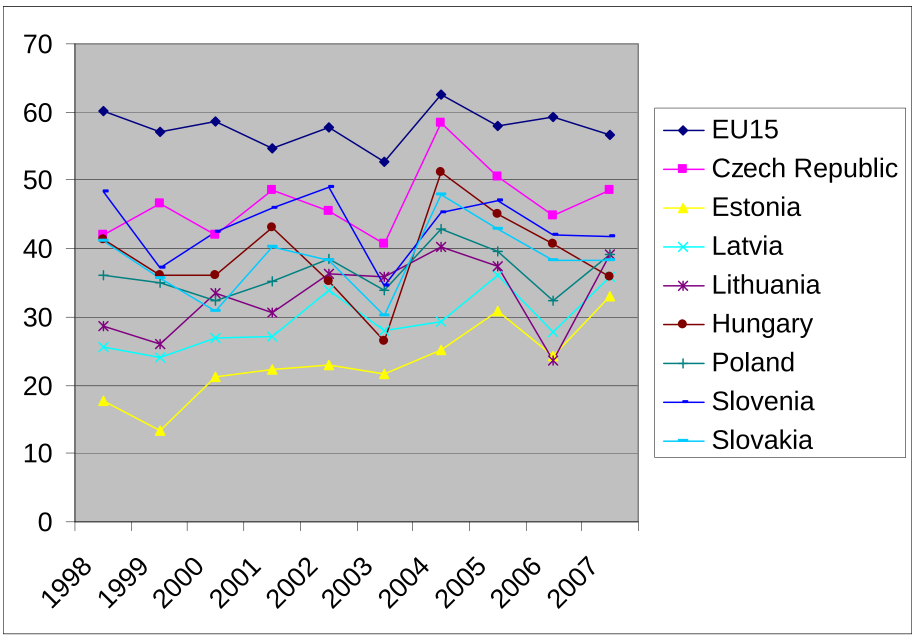
$$+\ 1\% \times (\text{Yield (REF, EU-25, 2020)} - \text{Yield (REF, region, 2020)})$$

$$\times\ (2020\text{-accession year})$$

This implies, for example, that average milk yield in Western Balkan countries would be 2850 kg per cow after accession while they would be 2560 kg under reference run conditions. This may appear a relatively moderate catching up given that milk yields are expected to be 7640 kg in the EU-25 and even 3640 kg in Romania. However, it should be noted that for most Western Balkan countries accession will not occur before 2015.

Note that the above formula implies a transparent differentiation of the catching up effect by crops. While the basic principle is plausible it has to be acknowledged that there is no underlying empirical analysis for the current NMS as time series appear too short. Some catching up already occurred in the NMS where the following figure shows recent wheat yields in the EU-15 and selected NMS.

Figure 12: Wheat yields in the EU-15 and selected NMS [100 kg / ha]



This catching up effect contributed to accession impacts in general and it is also important in the dairy sector. Whether the introduction of milk quotas in the Western Balkans would act as a constraint for these countries depends of course on the assumed level of quotas. It has been mentioned in Section 2.6 that quotas have been assumed to be negotiated according to the production level attained by 2020 under reference run conditions, i.e. including normal yield growth. This is less restrictive than the negotiation outcome for EU-02, where quotas were basically specified in line with observed production (and share of subsistence) at the point of closing the negotiations. Any additional production from the catching up hypothesis would, therefore, trigger some adjustment in the dairy herd and hence implications for the cattle sector and 'Fodder' demand. Due to the key importance of dairy results it is advisable to start the analysis exactly here (Table 40).

The Western Balkans accession scenario 'WB' would show an increase of milk production by 1.7% due to the catching up effect which would exert downward pressure on milk prices, as raw milk is considered badly tradable. This effect is compensated in Albania and Serbia by rising prices for important dairy products (cheese, fresh products) whereas it is exacerbated by price changes on dairy markets in TFYR Macedonia and Montenegro. Negative impacts from dairy markets may also be inferred for the latter countries from declining deliveries. As demand for direct sales respond to raw milk prices their increase would be strongest in TFYR Macedonia. The response of own consumption can be divided in two parts: one related to changes in feed demand and the other related to changes in own consumption by farm household. The former has a quite high share in Croatia and declines due to a loss of profitability of meat production in general. The latter, on the contrary, is assumed to be unresponsive to accession, as any assumptions about particular changes would be difficult to support empirically.

The sensitivity analysis on price convergence confirms that higher convergence to EU prices tends to magnify most impacts of accession in scenario WB-CONV which are following from a reduction in price differentials[38]. This may have been expected and points to the importance of low transaction costs for a propagation of price impacts.

The last scenario WB-EXPIRY has been added both to investigate the importance of the quota constraint from a methodological point of view as well as to render the scenario realistic. As has been argued in other sections the expiry of the quota system may be taken to be almost sure. Hence the scenario impacts relative to REF (with milk quotas, in line with the assumptions in ARCOTRASS, 2006) may be of limited political relevance. All effects for WB-EXPIRY are given relative to EXPIRY (discussed in Section 4.2.3) to show the isolated impact of accession in a situation where quotas are already abolished. Without quotas the price impacts would be more uniformly negative due to the need to create the demand for the additional production. Production impacts would be more heterogeneous because the yield effect depends on the yield gap in the regions concerned. This gap is highest in Kosovo and smallest in Croatia such that technology transfer is expected to have the highest effectiveness in Kosovo and the smallest in Croatia (Table 41).

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[38] Related variables may have to change in the opposite direction, of course. Thus we see, for example, that direct sales would decrease in Kosovo and in Bosnia-Herzegovina under WB-CONV, whereas they were slightly increasing under WB, because producer prices are pulled up by additional demand from dairies. This may reduce the aggregate change for the Western Balkans (column price) or even reverse it (column direct sales). Therefore it applies to most but not to all changes, that they are magnified under WB-CONV compared to scenario WB.

Table 40: Market results for the Western Balkans scenarios: Cow milk [quantities: 1000 t, prices: €/t]

	REF						WB (% to REF)						WB-CONV (% to REF)						WB-EXPIRY (% to EXPIRY)					
	Price	Production	Deliveries	Direct sales	Own cons.	Net trade	Price	Prod.	Deliv.	Dir. sales	Own cons.	Net trade	Price	Prod.	Deliv.	Dir. sales	Own cons.	Net trade	Price	Prod.	Deliv.	Dir. sales	Own cons.	Net trade
EU27	280	153773	141019	3670	9555	-472	-0.2	0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0	-2.4	-0.1	0.0	-0.2	0.0	0.0	0.2	0.0	0.4
Albania	218	980	483	355	141	1	3.0	1.7	5.7	-3.6	1.8	-4.9	5.6	1.7	7.5	-6.1	1.6	-7.3	-5.3	13.0	19.7	9.3	-0.1	8.1
Bosnia-Herzegovina	218	573	168	215	198	-8	-0.5	1.8	6.2	0.3	-0.5	0.0	1.2	1.8	8.3	-1.3	-0.5	0.1	-23.1	13.7	16.7	23.1	0.3	-4.0
Croatia	242	1062	880	59	131	-7	-9.1	1.6	2.4	6.8	-6.5	-1.9	-10.5	1.6	2.6	6.4	-7.4	-2.5	-23.5	8.2	8.2	29.4	-2.1	-5.4
Kosovo	320	277	27	128	108	14	-0.1	1.2	10.4	0.0	0.4	0.0	1.0	1.2	13.8	-0.7	0.4	0.0	-30.3	19.6	64.9	28.6	0.2	1.7
Montenegro	310	197	34	93	70	0	-8.5	1.3	-0.1	3.5	-1.0	321.8	-10.3	1.3	-1.7	4.1	-1.0	431.8	-28.5	15.8	14.9	28.0	0.0	-783.5
Serbia	158	1769	1325	278	167	-2	1.9	1.9	2.8	-1.3	-0.2	4.0	4.5	1.9	3.7	-5.3	-0.2	7.0	-12.9	9.4	7.3	24.5	0.1	-22.6
TFYR Macedonia	264	229	102	86	44	-3	-15.4	1.7	-8.0	13.9	-0.3	-2.7	-19.0	1.7	-11.4	17.7	0.1	-3.6	-23.2	8.9	-3.1	26.3	1.3	-4.2
Western Balkan	213	5086	3018	1213	861	-5	-2.5	1.7	3.0	0.3	-0.9	-2.6	-1.7	1.7	3.8	-1.4	-1.0	-2.3	-17.7	11.1	10.3	20.8	-0.2	-31.2

Table 41: Dairy cow results for the Western Balkans

	REF					WB					WB-CONV					WB-EXPIRY				
	Price	Yield	Gross revenue	Rent	Herd size	Price	Yield	Gross revenue	Rent	Herd size	Price	Yield	Gross revenue	Rent	Herd size	Price	Yield	Gross revenue	Rent	Herd size
	[€/t]	[kg/hd]	[€/hd]	[%]	[1000 hd]	[% to REF or % for Rent]					[% to REF or % for Rent]					[% to EXPIRY or % for Rent]				
EU27	280	7419	2350	17	20726	-0.2	0.0	0.1	17.5	0.0	0.5	0.0	0.8	18.3	0.0	-0.2	0.0	-0.2	0.0	0.0
Albania	218	2155	588	0	455	3.0	12.9	14.6	156.2	-9.9	5.6	12.9	17.2	155.8	-9.9	-5.3	12.9	6.0	0.0	0.1
Bosnia-Herzegovina	218	2474	696	0	232	-0.5	10.6	8.1	67.2	-8.0	1.2	10.6	9.3	68.2	-8.0	-23.1	10.6	-12.8	0.0	2.8
Croatia	242	4033	1254	0	263	-9.1	9.1	-1.0	56.4	-6.9	-10.5	9.1	-2.4	55.9	-6.9	-23.5	9.1	-13.9	0.0	-0.8
Kosovo	320	1564	613	0	177	-0.1	19.6	19.8	109.1	-15.4	1.0	19.6	21.5	108.5	-15.4	-30.3	19.6	-12.4	0.0	0.0
Montenegro	310	1987	784	0	99	-8.5	14.4	2.8	135.2	-11.4	-10.3	14.4	0.6	136.1	-11.4	-28.5	14.4	-16.3	0.0	1.3
Serbia	158	2609	616	0	678	1.9	9.8	8.9	50.9	-7.2	4.5	9.8	10.5	50.0	-7.2	-12.9	9.8	-3.5	0.0	-0.3
TFYR Macedonia	264	2463	795	0	93	-15.4	10.6	-4.1	50.0	-8.1	-19.0	10.6	-7.0	48.8	-8.1	-23.2	10.6	-11.8	0.0	-1.5
Western Balkan	213	2547	719	0	1997	-2.5	11.6	7.6	86.0	-8.8	-1.7	11.6	8.2	85.6	-8.8	-17.7	11.0	-7.0	0.0	0.1

Table 42: Market results for the Western Balkans scenarios: Butter [quantities: 1000 t, prices: €/t]

	REF				WB				WB-CONV				WB-EXPIRY			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%
EU27	2944	1907.2	1999.2	-92.1	0.0	0.2	0.0	-4.3	0.7	-0.2	-0.1	1.8	0.0	0.2	0.0	13.0
Albania	3271	2.2	3.0	-0.9	-6.2	-20.3	3.1	60.8	-8.4	-29.9	4.2	88.1	-6.4	-12.4	4.2	46.2
Bosnia-Herzegovina	2481	0.5	5.5	-5.0	3.0	8.1	-1.7	-2.7	4.5	10.4	-2.5	-3.8	2.9	37.5	-1.5	-5.0
Croatia	2693	2.7	2.1	0.6	0.6	4.2	-2.2	26.5	1.4	3.8	-2.6	26.2	-1.1	20.2	-1.2	99.9
Kosovo	3251	0.1	0.0	0.1	-7.6			0.0	-9.7	0.0			-7.6	0.0		0.0
Montenegro	3369	0.1	0.1	0.0	-9.9	0.0	0.0	0.0	-12.7	0.0	0.0	0.0	-9.9	0.0	0.0	0.0
Serbia	1643	3.3	4.6	-1.3	15.0	-13.9	-5.0	18.1	22.5	-22.2	-7.2	31.4	13.1	1.9	-3.9	-17.3
TFYR Macedonia	3015	0.4	2.3	-1.9	-3.0	2.0	-2.1	-2.9	-3.9	0.1	-2.6	-3.2	-3.1	9.7	-2.0	-4.1
Western Balkan	2460	9.2	17.6	-8.5	2.0	-8.1	-1.8	4.9	3.6	-13.4	-2.6	9.1	0.2	6.0	-1.2	-8.6

Table 41 also shows how price changes and yield effects affect gross revenues. As other factors (such as premiums, calves prices etc.) are usually less important, the gross revenue change is approximately the sum of milk price and yield changes. Rising gross revenues, if not counteracted by rising costs for energy and protein, would lead to an increase in activity levels and to an increase in production. Table 41 however shows a decline of dairy cow herds due to the impact of quotas. This decline implies that shadow revenues are not increasing but decreasing which creates the large rents shown in Table 41. Note that even in TFYR Macedonia, where gross revenues are clearly decreasing due to the large drop in milk prices, there would be significant rent. This is because the drop in market revenues would have triggered a smaller decline in the dairy cow herd, say 4%, than required to comply with the quotas (-8%). With WB-CONV there would be no differences in the impacts on yields and, given quotas, on herd sizes whereas there are some small impacts on prices and rents. From scenario results for WB-EXPIRY it follows that the quota constraint increases the decline in dairy cow numbers but at the same time benefits producer prices. In Montenegro and Bosnia-Herzegovina declining 'Fodder' (net) prices (see Table 49) would cause an increase in the dairy cow herd in spite of declining market revenues.

For the further discussion of market results for secondary milk products and all other markets we may return to the more aggregate and focussed presentation of earlier sections. An increased availability of raw milk translates into a higher production of those secondary milk products. Compared to the EU-27, 'Butter' is far less important in Western Balkan countries (Table 42). Whereas in EU-27 about 1.4% of product weight of deliveries are transformed into 'Butter' this is only 0.3% in the Western Balkans[39]. Under accession prices would drop in Kosovo, Montenegro, and TFYR Macedonia, but in contrast to Albania the decline in raw milk prices is clearly larger in TFYR Macedonia such that production would increase nonetheless[40]. Scenario WB-CONV would give qualitatively similar but stronger effects. The fact that 'Butter' production is declining in Serbia, in spite of increasing prices results from a strong increase of milk fat prices, driven up by rising prices for cream (second important product for milk fat after fresh milk products in Serbia) and concentrated milk. Linkages to cream are also behind the surprisingly strong impact on the EU-27 net import of 'Butter': as the Western Balkans will produce more cream, the EU-27 will produce less and convert more milk fat into 'Butter'. An accession without quotas would reduce bottlenecks through scarce milk fat such that production of 'Butter' would increase in all Western Balkan regions apart from Albania.

The market for 'Skimmed milk powder' is also quite unimportant in the region such that it is more interesting to look at 'Cheese' (Table 43) which is less important than in the EU-27 but at least accounts for 18% of the protein in raw milk in Western Balkan countries (52% in the EU-27). Price convergence would moderately decrease 'Cheese' prices in Croatia and TFYR Macedonia whereas they would drop strongly in Kosovo as well as in Montenegro and increase in other Western Balkan countries. Note that production is nonetheless stable in Montenegro, because the decline of the raw milk price is similar to that of 'Cheese' prices (see

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[39] In addition deliveries are far less important in some Western Balkan countries; say Kosovo and Montenegro, than in the EU-27. In these countries it is likely that more butter (and cheese) is produced and consumed on farm than over commercial marketing channels but the raw milk balance data do not permit differentiating subsistence milk from direct sales are. Instead all such quantities are treated as if they were liquid raw milk.

[40] A technical explanation should be added why near zero production of butter in Kosovo and Montenegro is not declining further in spite of declining prices: basically this reflects a 'smooth' lower bound imposed to guarantee some slightly positive production quantities whenever this has been observed in the base year.

above, Table 40). The strong expansion of 'Cheese' production in TFYR Macedonia (see Table 44) also results from the strong decrease in raw milk prices which improves net margins for 'Cheese' production. On average 'Cheese' prices are slightly increasing in the whole Western Balkans such that consumption is expected to moderately decline. These effects are again strengthened under WB-CONV. Absence of milk quotas in WB-EXPIRY would support a further increase in 'Cheese' production which limits the increase of regional 'Cheese' prices and the decline in demand. However, the increase in production is dominating such that net imports decline stronger under WB-EXPIRY (by about 45%) than under WB (35%). Less net imports of the Western Balkan would slightly reduce prices and net exports of the EU-27.

Among all dairy products the greatest importance is attached to fresh milk products on the Western Balkans (Table 44), amounting to 55% of raw milk deliveries in product weight (compared to 34% in the EU-27). Price changes are mainly related to reference run price differences to the EU. They explain a market increase in production in Albania which is crucial (together with the expansion of 'Cheese' and cream production) for the decline of 'Butter' production in this country. Furthermore these favourable price developments for dairy products in Albania are at the origin of increasing raw milk prices in this country, whereas raw milk prices in most other Western Balkan countries would decline. Price changes have quite transparent effects for production, demand and net exports in the region, apart from the small decrease in demand in Croatia and Montenegro, in spite of own prices declining[41]. Strongly increasing net exports of the Western Balkans would increase net imports of the EU-27 in a similar magnitude. Note that the key contribution to additional net exports of fresh milk products would not come from Albania and Kosovo where relative changes are large, but from Serbia which may be better equipped to translate the opportunities from cost advantages into additional exports.

Milk production is related to 'Beef' production over the calves balance, to other animal activities through competition for 'Fodder' and to all meat markets over final consumer demand impacts. Furthermore other meat markets are affected by price changes and potentially changes in support measures. Overall the balance of these effects is quite small for 'Beef' and usually dominated by the price changes for 'Beef'[42], leading to some additional net imports under WB and, reinforced, under WB-CONV (Table 45). Under WB-EXPIRY the impacts from the quota constraint would be relaxed and the dairy cow herd would slightly increase in the region. Hence 'Beef' production clearly increases in all Western Balkan countries, in particular in Serbia, resulting in lower net imports for the region as a whole.

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[41] Usually large changes in consumption are easily traced to changes in the own price. If changes are smaller such as in this example, a detailed explanation would have to consider price changes at the consumer level for substitutable products (mainly dairy, meats) as well. Doing so in all cases would distract attention from the main changes to a multitude of details and reduce readability of this report, in view of the number of products and countries concerned. In this case, for example, the decline in fresh milk products consumption in Croatia may be attributed largely to the decline in prices of 'Pork' which increases in consumption and partly replaces milk products.

[42] It may be mentioned that some of the producer prices have been significantly revised compared to ARCOTRASS (2006). For example, in the reference run of that study beef prices were at 1915 €/t in Serbia. As a consequence, this study also revises significantly the related accession impacts of ARCOTRASS (2006).

Table 43: Market results for the Western Balkans scenarios: Cheese [quantities: 1000 t, prices: €/t]

	REF				WB				WB-CONV				WB-EXPIRY			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%
EU27	4679	9627.2	9172.8	454.4	-0.1	0.0	0.1	-1.9	0.1	0.0	0.1	-1.6	-0.2	0.0	0.1	-2.2
Albania	2579	22.8	31.8	-9.0	11.9	17.7	-13.4	-92.8	18.3	25.9	-18.8	-132.8	10.9	30.4	-11.7	-96.8
Bosnia-Herzegovina	3208	3.8	14.6	-10.8	8.0	6.7	-9.7	-15.6	12.0	9.3	-13.7	-21.9	7.8	13.8	-10.7	-18.7
Croatia	4710	35.2	47.0	-11.8	-1.1	8.1	-2.9	-35.8	-1.2	10.7	-3.4	-45.6	-1.7	16.0	-2.3	-51.0
Kosovo	5784	0.3	0.5	-0.3	-9.1	-8.4	21.8	56.1	-12.4	-14.2	25.8	71.2	-10.4	27.6	26.1	24.6
Montenegro	5463	0.6	0.8	-0.2	-9.9	1.2	6.4	23.5	-12.9	0.2	7.7	31.9	-10.6	8.5	7.7	5.4
Serbia	4068	23.3	31.4	-8.0	2.1	3.0	-0.8	-11.7	3.1	3.7	-2.0	-18.7	1.5	7.3	-0.1	-18.8
TFYR Macedonia	5041	2.1	4.6	-2.5	-5.4	19.2	7.0	-3.4	-6.8	25.6	10.2	-2.9	-5.8	23.4	7.0	-5.8
Western Balkan	3940	88.2	130.7	-42.5	1.4	9.3	-5.2	-35.4	2.5	12.9	-7.3	-49.3	0.4	17.5	-4.6	-44.6

Table 44: Market results for the Western Balkans scenarios: Fresh milk products [quantities: 1000 t, prices: €/t]

	REF				WB				WB-CONV				WB-EXPIRY			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%
EU27	708	48512.2	48640.4	-128.1	-0.1	0.0	0.0	27.6	-0.3	0.3	0.3	15.5	-0.2	-0.1	0.1	166.2
Albania	409	31.5	25.2	6.3	10.3	17.6	-13.9	143.5	16.2	26.9	-18.1	206.5	9.7	23.3	-12.5	193.2
Bosnia-Herzegovina	514	120.6	137.4	-16.8	6.1	6.4	-6.0	-95.5	9.0	8.6	-7.8	-125.7	5.1	16.4	-5.1	-128.3
Croatia	754	519.2	406.5	112.7	-3.3	-3.7	-2.2	-9.0	-4.7	-6.0	-2.0	-20.3	-3.8	-1.0	-2.2	3.4
Kosovo	495	18.4	17.7	0.7	6.3	11.9	-3.5	389.3	9.6	16.2	-4.9	531.1	2.4	63.7	2.0	125848
Montenegro	783	17.3	18.3	-1.0	-5.8	0.8	0.3	-7.0	-7.8	-1.3	0.3	28.1	-7.2	19.6	-1.4	-232.3
Serbia	630	880.3	788.4	91.9	1.7	0.2	-3.9	35.2	2.6	-0.3	-4.6	36.4	0.8	3.8	-4.4	91.4
TFYR Macedonia	949	67.1	69.2	-2.2	-12.4	-13.6	5.5	597.3	-17.1	-20.4	7.5	874.6	-13.0	-11.2	5.4	332.1
Western Balkan	669	1654.3	1462.7	191.7	-1.0	-0.7	-3.3	19.4	-1.3	-1.6	-3.8	15.3	-2.1	3.8	-3.4	70.3

Table 45: Market results for the Western Balkans scenarios: Beef [quantities: 1000 t, prices: €/t]

	REF				WB				WB-CONV				WB-EXPIRY			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%
EU27	2846	7518.3	8134.9	-616.7	0.0	-0.1	0.0	0.8	0.4	0.0	-0.1	-1.0	0.0	0.7	0.3	-0.3
Albania	2555	48.4	53.7	-5.3	1.7	0.9	-0.1	-9.4	2.7	1.1	0.6	-3.8	1.8	0.2	0.2	0.5
Bosnia-Herzegovina	3130	26.6	46.4	-19.8	-5.2	-0.7	1.8	5.2	-6.9	-0.9	3.1	8.6	-5.4	2.0	1.9	1.6
Croatia	3058	54.3	102.7	-48.5	-5.8	-0.9	-1.3	-1.8	-7.4	-1.1	-2.0	-3.0	-5.8	2.3	-0.8	-4.2
Kosovo	1919	31.1	28.8	2.3	6.3	7.1	-6.4	176.4	10.4	7.8	-8.7	214.3	6.8	2.3	-8.3	125.6
Montenegro	3383	9.2	15.3	-6.1	-10.5	-6.4	6.0	24.8	-13.9	-6.5	7.3	28.2	-10.8	0.3	4.0	9.6
Serbia	2986	107.2	96.5	10.7	-3.8	0.2	7.3	-64.2	-5.1	-0.2	10.1	-93.2	-3.8	2.2	7.4	-47.8
TFYR Macedonia	2406	19.4	36.8	-17.3	2.7	0.9	-8.1	-18.2	4.1	1.1	-10.7	-24.1	2.7	1.4	-8.2	-19.3
Western Balkan	2804	296.2	380.1	-83.9	-2.9	0.6	0.7	1.0	-3.5	0.5	1.1	3.1	-2.7	1.8	0.7	-2.4

Impacts on 'Pork' markets (Table 46) are again mainly driven by price convergence effects which clearly relate to the price differences to the EU-27 under REF. However 'Pork' gives a clear example for the distinction of transaction cost driven and tariff driven price differences. 'Pork' prices are very similar in Croatia and Bosnia-Herzegovina and clearly above EU prices. All else equal, we would expect the same drop in 'Pork' prices in both markets after accession. However historical tariffs have been much higher in Croatia than in Bosnia-Herzegovina such that a larger part of the observed price difference is considered due to tariffs and thus likely to adjust after accession. As a consequence 'Pork' prices are expected to drop by 16.9% in Croatia but only by 8.5% in Bosnia-Herzegovina with corresponding consequences for net imports. A surprising result may be that 'Pork' consumption decreases in Montenegro in spite of declining prices under WB. This is probably due to substitution with 'Beef' and 'Poultry meat' which are both increasing due to large price drops.

A stronger price convergence under WB-CONV would increase the price and market effects in general whereas it (evidently) matters less for 'Pork' whether accession is taking place with (WB-EXPIRY) or without milk quotas (WB). Net imports of the Western Balkans as a whole would increase after accession which also applies to poultry (Table 47).

Net trade impacts are significantly stemming from demand responding to marked price changes. Again it is noteworthy that these price effects differ from ARCOTRASS (2006) where poultry prices in TFYR Macedonia were estimated very low (at 512 €/t). Additional net imports of poultry would be mirrored in more net exports from the EU-27.

It appears that among meats only the relatively unimportant sheep and goat sector would offer some export potential after accession to the Western Balkans because prices are clearly lower than in the EU-27, apart from Croatia (Table 48). Data revisions led to higher prices in TFYR Macedonia (assessed to be about 2300 €/t in ARCOTRASS, 2006) and thus to a more moderate response of net trade in this country. However, the revision of data in Albania has confirmed the earlier assumption of very low sheep prices and thus some export potential for this country. Nonetheless it should be acknowledged that necessary infrastructure improvements may have been insufficiently accounted for in the sector wide analysis with CAPSIM.

Table 46: Market results for the Western Balkans scenarios: Pork [quantities: 1000 t, prices: €/t]

	REF				WB				WB-CONV				WB-EXPIRY			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%
EU27	1271	23639	21624	2014	0.0	0.0	0.0	0.4	0.1	-0.1	-0.1	0.4	0.0	0.3	0.3	0.3
Albania	1555	12.8	32.8	-20.0	-7.4	-9.5	13.5	28.3	-9.9	-11.3	19.0	38.5	-7.5	-2.9	14.3	25.3
Bosnia-Herzegovina	1697	8.0	33.7	-25.7	-8.5	0.0	3.6	4.6	-11.5	-1.0	4.6	6.4	-8.5	-1.9	3.1	4.4
Croatia	1683	175.9	234.5	-58.6	-16.9	-1.9	5.6	28.0	-21.8	-2.7	7.1	36.6	-16.9	-2.3	5.4	28.9
Kosovo	1299	1.0	2.8	-1.8	-1.4	-0.9	7.3	11.8	-1.7	-1.4	9.8	16.1	-1.4	-1.8	6.3	10.8
Montenegro	2044	4.9	7.6	-2.7	-9.4	-5.0	-6.1	-7.9	-13.4	-5.3	-6.3	-8.3	-9.7	-1.1	-7.8	-20.1
Serbia	1227	416.1	366.6	49.5	0.3	0.8	-4.3	38.2	0.7	1.2	-5.3	49.4	0.3	1.2	-4.4	41.9
TFYR Macedonia	1824	12.2	18.2	-6.0	-17.8	-5.5	15.8	58.8	-23.2	-7.0	21.2	78.2	-17.8	-5.4	15.8	58.2
Western Balkan	1385	630.9	696.2	-65.3	-6.5	-0.4	0.8	12.1	-8.3	-0.4	1.3	17.0	-6.6	-0.1	0.7	8.2

Table 47: Market results for the Western Balkans scenarios: Poultry [quantities: 1000 t, prices: €/t]

	REF				WB				WB-CONV				WB-EXPIRY			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%
EU27	1296	12927	12374	553	0.1	0.1	-0.1	3.4	0.2	0.0	-0.2	5.9	0.1	0.2	0.0	3.3
Albania	1031	14.6	32.2	-17.6	5.0	4.2	-1.7	-6.6	7.6	4.8	-1.7	-7.0	5.1	0.9	-1.5	-3.7
Bosnia-Herzegovina	1445	11.3	33.9	-22.6	-5.7	1.3	1.2	1.2	-7.3	1.3	1.4	1.5	-5.7	1.1	0.2	-0.5
Croatia	1440	127.7	116.7	11.0	-6.1	1.2	-2.5	40.1	-7.8	1.3	-3.0	47.6	-6.1	1.2	-2.6	40.1
Kosovo	1175	1.6	39.1	-37.5	2.3	1.7	1.5	1.5	3.4	2.1	2.5	2.6	2.3	1.2	0.6	0.5
Montenegro	2082	2.1	7.5	-5.4	-17.8	3.9	13.2	16.8	-23.5	4.2	17.9	23.2	-17.9	0.9	10.1	13.6
Serbia	2048	97.2	86.4	10.8	-19.5	-13.7	45.2	-486.9	-26.6	-18.4	62.3	-666.5	-19.5	-12.6	45.3	-475.0
TFYR Macedonia	1235	4.6	45.8	-41.2	1.3	3.0	-7.1	-8.3	1.9	3.5	-9.2	-10.6	1.3	3.5	-7.1	-8.3
Western Balkan	1645	259.1	361.7	-102.6	-12.7	-4.2	9.5	44.0	-16.6	-5.8	13.4	61.8	-12.6	-4.0	9.2	42.6

Table 48: Market results for the Western Balkans scenarios: Sheep and goat meat [quantities: 1000 t, prices: €/t]

	REF				WB				WB-CONV				WB-EXPIRY			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%
EU27	5384	1183	1567	-384	-0.2	0.0	0.1	0.4	0.4	0.2	0.1	-0.1	-0.2	0.3	0.2	0.3
Albania	2671	30.5	31.4	-0.9	15.7	6.0	-12.1	-649.6	24.2	7.0	-18.5	-911.7	16.2	1.2	-13.6	-616.5
Bosnia-Herzegovina	4129	11.4	10.9	0.5	3.4	1.9	-9.4	245.1	5.8	2.1	-12.1	308.2	3.3	0.6	-11.1	241.3
Croatia	6335	7.3	11.0	-3.7	-6.0	1.4	2.2	4.0	-8.1	1.3	3.2	6.9	-5.9	0.3	2.0	5.4
Kosovo	4101	0.5	0.8	-0.2	6.0	0.7	5.2	14.6	8.6	0.7	1.4	3.0	6.1	-0.3	4.7	15.1
Montenegro	4493	0.3	0.9	-0.6	2.4	25.8	-14.5	-30.8	3.6	25.2	-26.2	-47.0	2.7	6.4	-20.9	-32.1
Serbia	3501	24.3	21.7	2.6	7.5	2.1	-18.3	169.0	11.8	2.7	-26.1	238.0	7.5	1.4	-19.0	160.9
TFYR Macedonia	3870	6.8	1.0	5.8	7.1	9.3	-26.4	15.4	10.6	9.4	-26.4	15.6	7.1	7.1	-24.8	12.4
Western Balkan	3569	81.0	77.5	3.4	6.6	4.1	-11.5	357.1	10.7	4.7	-16.6	486.8	7.1	1.6	-12.6	289.9

The animal sector is related to crops over feed demand but other determinants are at least as important. Price convergence and yield catching up effects have been mentioned already. Another aspect is that EU support would be granted as decoupled payments. However it has been assumed that, by 2020, land would have to be maintained in good agricultural condition which is estimated to involve costs of 25 €/ha for fallow land in the NMS and Balkan countries (compared to 50 € in the EU-15). This obligation tends to decrease the incentive for land to be left fallow (see Witzke and Zintl, 2007, Subsection 2.4.2). Nonetheless there would be some increase in fallow land in several Western Balkan countries in certain accession scenarios because grass prices are declining to nearly zero.

As an analysis of area allocation has to consider the whole crop sector the following tables give information on crop aggregates which together give total agricultural land. Before presenting the area allocation results, Table 49 gives information on their main drivers. Prices of 'Cereals', 'Oilseeds & pulses', 'Perennial crops' (wine, olives, fruits) and 'Other arable crops' (rice, 'potatoes and vegetables', sugar beet, other industrial crops, other crops) may be seen to slightly decline on average, whereas yields are increasing moderately. On the contrary endogenous 'Fodder' prices may be expected to decline strongly. Gross revenues are usually developing more positively than the sum of price and yield changes because accession renders all crops eligible for EU premiums. Their influence is explaining the increase in gross revenue of 'Set-aside & fallow' land which was zero in the reference run in Western Balkan countries. EU premiums are differentiated according to the assumptions in Section 5 (first year SAPS rates of 40 €/ha in Croatia, 35 €/ha in Serbia and 30 €/ha otherwise) and reduced by 25 €/ha for fallow land as mentioned above. The premium in Croatia is highest, not only due to the differentiation of the initial SAPS rate but also because Croatia (accession assumed for 2010) would be at 100% of the full premiums by 2020 whereas other countries would be only at 60% (accession assumed for 2015). Finally it should be mentioned that Serbia is assumed to use some topping up from the national budget.

Gross revenues are linking Table 49 and Table 50. Usually increasing gross revenues will lead to increasing areas and vice versa as may be observed in Albania in Table 50. However, even if all gross revenues are increasing (as in Croatia in Table 50 under WB or in Serbia under WB-EXPIRY) the area balance precludes that all areas are also increasing. Instead the price of land may adjust (upwards) such that profitability of some arable areas will decline. Alternatively grassland will decline and may turn into fallow land if the price of grass is falling strongly which holds for all Western Balkan countries except Albania and Serbia under WB. The strong decline in grass prices mainly derives from the decline in the dairy herd and is often reversed therefore under WB-EXPIRY. In Bosnia-Herzegovina, Croatia and TFYR Macedonia there would be a decline in the dairy herd even without quotas, because important dairy products (fresh milk products) appear to have weak competitiveness relative to the EU-27. On the contrary there is no diversion of grassland into fallow land under WB in Serbia and Albania because other sectors (e.g. beef or sheep) may compensate for the loss of 'Fodder' demand from dairy cows.

Apart from the general weakness of 'Fodder' demand, deriving from the quota effect, changes in area allocation are quite heterogeneous across countries. For cereal area there is an increase in Albania and Bosnia-Herzegovina but a decline in Serbia such that the overall change for the region is quite small. Changes in the 'Oilseeds & pulses' aggregate are dominated by the small decrease in Serbia which has the largest 'Oilseeds' area in the region. It may appear puzzling to see that 'Oilseeds' are decreasing in Serbia whereas 'Perennial crops' are increasing although gross revenues appear to develop more favourably for 'Oilseeds'. Here it is necessary to acknowledge the absolute values in the reference run. A certain increase in the land price (of 120 €/ha) has a larger impact on the crop with the smaller gross revenue (in this case 'Oilseeds'), whereas land cost weigh less for 'Perennial crops'. As a consequence the apparently large increase in gross revenues of 'Oilseeds & pulses' is more than compensated by the increase in land price whereas the competitive position of 'Perennial crops' has improved. In general 'Perennial crops' would expand in the regions after accession, the only exception being Kosovo with tiny areas concerned. The area of 'Other arable crops' would also expand in the region, mainly due to a large increase in Serbia where gross revenues would improve considerably. This strong improvement may be traced back to the fact that not only yields, but also prices may be expected to increase after accession in Serbia (Table 49). On the contrary in Montenegro and TFYR Macedonia prices, gross revenues and areas of 'Other arable crops' would show a sizeable decline.

Area impacts under WB-CONV are often stronger than under WB but sometimes the direction of impacts may change as well. Among those cases it is noteworthy, for example, that the larger price drops of 'Other arable crops' (mainly 'potatoes and vegetables') under WB-CONV in Croatia is not completely compensated by increasing yields anymore, such that areas decline. Scenario WB-EXPIRY reverses the conversion of grass land into fallow land to a large extent such that 'Fodder' area declines less. The exception is TFYR Macedonia where feed demand for 'Fodder' is reduced because cereal prices are strongly declining (Table 49). The sum of area and yield impacts gives (approximately) the change in production with corresponding effects on markets.

Table 49: Prices [€/t], yields [kg/ha] and gross revenues [€/ha] of crop aggregates for the Western Balkans scenarios

		REF						WB (% to REF, *Δ for set aside & fallow*)						WB-CONV (% to REF, *Δ for set aside & fallow*)						WB-EXPIRY (% to EXPIRY, *Δ for set aside & fallow*)					
		Cereals	Oilseeds & pulses	Peren. crops	Other arable	Fodder	Set aside & fallow	Cereals	Oilseeds & pulses	Peren. crops	Other arable	Fodder	Set aside & fallow	Cereals	Oilseeds & pulses	Peren. crops	Other arable	Fodder	Set aside & fallow	Cereals	Oilseeds & pulses	Peren. crops	Other arable	Fodder	Set aside & fallow
EU27	Price	132	192	948	1078	21		-0.2	0.0	-0.1	-0.1	-0.5		0.2	0.1	0.1	-0.6	-0.5		0.9	0.1	-0.1	-0.1	8.0	
	Yield	5387	2619	3791	7768	20451		0.0	0.0	0.0	0.0	0.0		0.1	0.0	0.0	-0.1	0.0		0.0	0.0	0.0	0.0	0.1	
	Gross rev.	935	730	3794	8648	639	235	-0.1	0.0	-0.1	-0.2	-0.4	*-0*	0.2	0.0	0.0	-0.8	-0.3	*-0*	0.6	0.0	-0.1	-0.1	4.8	*+0*
AL	Price	168	614	887	957	28		-4.8	-11.6	1.0	1.3	-27.6		-6.7	-17.2	1.5	1.9	-27.7		-3.7	-11.3	0.9	1.3	2.6	
	Yield	4320	1657	3270	30743	23293		1.3	2.6	3.1	-0.4	-0.2		1.3	2.3	3.3	-0.2	-0.2		1.5	2.5	3.1	-0.2	0.0	
	Gross rev.	728	1017	2902	29435	651	0	6.4	-2.2	6.6	1.2	-16.7	*+47*	4.4	-8.3	7.4	1.9	-16.8	*+47*	7.6	-2.0	6.5	1.4	13.7	*+47*
BA	Price	158	476	1115	1237	28		-6.2	-8.6	-10.3	-5.2	-82.9		-8.3	-14.5	-13.1	-7.0	-83.2		-5.1	-8.8	-10.3	-5.1	-76.3	
	Yield	4957	1506	3163	2909	9477		-0.1	3.4	4.7	12.4	5.2		-0.2	4.2	4.7	12.4	5.2		0.0	3.7	4.7	12.4	5.3	
	Gross rev.	784	716	3526	3597	258	0	2.8	4.6	-4.0	8.6	-55.2	*+47*	0.7	-0.9	-6.9	6.6	-55.5	*+47*	4.1	4.6	-4.0	8.7	-48.5	*+47*
HR	Price	132	192	908	1276	32		-3.5	-1.0	-1.7	-12.7	-62.5		-4.1	-1.2	-1.9	-17.4	-63.1		-2.1	-0.8	-1.7	-12.7	-59.4	
	Yield	6307	2491	2339	3894	7961		0.7	1.7	11.4	11.8	18.3		0.8	1.6	11.5	12.0	18.4		0.7	1.7	11.4	11.8	17.8	
	Gross rev.	832	478	2123	4968	257	0	16.3	34.1	17.0	0.8	1.1	*+135*	15.9	33.9	16.8	-4.3	0.5	*+135*	17.8	34.3	17.0	0.9	4.0	*+135*
KO	Price	147	488	948	1469	24		-4.4	-14.0	-1.6	-7.7	-78.3		-5.6	-19.6	-2.0	-10.6	-78.3		-3.4	-12.6	-1.9	-7.7	-22.9	
	Yield	4496	2746	3415	3254	15274		1.2	-0.3	3.9	9.2	1.3		1.2	-0.5	4.0	9.1	1.3		1.2	-0.1	3.7	9.3	1.6	
	Gross rev.	661	1340	3236	4781	364	0	7.6	-8.9	4.5	2.3	-58.2	*+47*	6.4	-14.6	4.1	-1.0	-58.3	*+47*	8.7	-7.3	4.0	2.4	-1.9	*+47*
MO	Price	144	0	1171	1462	20		-2.3		-7.3	-13.9	-95.0		-3.0		-9.9	-18.8	-95.1		-1.1		-7.2	-13.8	-50.9	
	Yield	3197	0	3871	5417	13819		2.9		2.6	4.4	2.1		2.9		2.6	4.4	2.1		3.0		2.6	4.4	2.1	
	Gross rev.	461	0	4534	7916	281	0	16.1		-3.3	-9.1	-69.3	*+47*	15.3		-6.0	-14.3	-69.4	*+47*	17.5		-3.2	-9.1	-24.3	*+47*
CS	Price	120	198	810	734	36		1.1	0.0	1.7	6.2	-43.7		2.1	-0.4	3.2	9.8	-43.4		2.7	0.0	1.7	6.4	-25.2	
	Yield	4963	2330	2781	2475	10878		0.5	1.3	5.9	14.7	4.6		0.5	1.5	5.9	15.0	4.6		0.5	1.3	5.9	14.6	4.7	
	Gross rev.	597	462	2253	1816	382	0	19.2	24.0	12.3	27.5	-14.9	*+80*	20.2	23.8	14.0	32.0	-14.7	*+80*	20.8	24.1	12.4	27.8	5.0	*+80*
MK	Price	190	509	851	1532	23		-17.7	-18.0	0.8	-18.1	-89.5		-22.4	-24.3	1.8	-24.4	-89.7		-16.9	-17.7	0.9	-18.1	-89.4	
	Yield	3677	1423	4260	4410	6418		3.4	5.5	2.8	2.0	10.1		3.6	5.8	3.0	0.6	10.2		3.4	5.4	2.8	2.0	10.1	
	Gross rev.	698	724	3626	6757	146	0	-4.7	-3.5	5.7	-15.5	-39.1	*+47*	-9.4	-9.9	6.8	-22.9	-39.4	*+47*	-3.8	-3.3	5.7	-15.4	-39.1	*+47*
WB	Price	132	213	865	995	28		-2.2	-1.4	-0.4	-1.9	-59.1		-2.4	-2.5	0.2	-2.2	-59.2		-0.8	-1.4	-0.4	-1.8	-37.5	
	Yield	5086	2304	2953	7749	11249		0.6	1.4	5.6	0.6	4.5		0.6	1.5	5.7	0.3	4.5		0.7	1.4	5.6	0.7	4.7	
	Gross rev.	670	491	2553	7714	322	0	14.3	23.2	9.2	-0.1	-30.2	*+57*	14.1	22.2	9.9	-0.7	-30.3	*+57*	15.8	23.2	9.2	0.1	-9.4	*+57*

Note: AL = Albania, BA = Bosnia-Herzegovina, HR = Croatia, KO = Kosovo, MO = Montenegro, CS = Serbia, MK = TFYR Macedonia, WB = Western Balkan

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Table 50: Gross revenues [€/ha], areas [1000 ha] and production [1000 t or million €] of crop aggregates for the Western Balkans scenarios

		REF						WB (% to REF)						WB-CONV (% to REF)						WB-EXPIRY (% to EXPIRY)					
		Cereals	Oilseeds & pulses	Peren. crops	Other arable	Fodder	Set aside & fallow	Cereals	Oilseeds & pulses	Peren. crops	Other arable	Fodder	Set aside & fallow	Cereals	Oilseeds & pulses	Peren. crops	Other arable	Fodder	Set aside & fallow	Cereals	Oilseeds & pulses	Peren. crops	Other arable	Fodder	Set aside & fallow
EU27	Gross rev.	935	730	3794	8648	639	235	-0.1	0.0	-0.1	-0.2	-0.4	0.0	0.2	0.0	0.0	-0.8	-0.3	0.0	0.6	0.0	-0.1	-0.1	4.8	0.0
	Area	54701	9312	11879	9385	78104	16163	0.0	0.1	0.0	-0.1	0.0	0.0	-0.1	0.1	0.2	0.6	0.0	0.0	0.0	-0.5	0.0	-0.2	0.1	0.0
	Production	294693	27969	45034	72898	1597327		0.0	0.1	0.0	-0.1	0.0		-0.1	0.0	0.1	0.4	0.0		0.0	-0.4	-0.1	-0.2	0.2	
AL	Gross rev.	728	1017	2902	29435	651	0	6.4	-2.2	6.6	1.2	-16.7		4.4	-8.3	7.4	1.9	-16.8		7.6	-2.0	6.5	1.4	13.7	
	Area	106	12	35	110	515	325	4.0	-2.3	0.5	0.8	-1.0	0.0	4.2	-5.2	0.5	0.6	-0.9	0.0	-1.0	-5.4	0.9	0.6	0.1	0.0
	Production	456	19	115	3386	11987		5.4	0.2	3.6	0.4	-1.2		5.6	-3.0	3.8	0.4	-1.1		0.5	-3.0	4.0	0.4	0.2	
BA	Gross rev.	784	716	3526	3597	258	0	2.8	4.6	-4.0	8.6	-55.2		0.7	-0.9	-6.9	6.6	-55.5		4.1	4.6	-4.0	8.7	-48.5	
	Area	327	16	47	72	1432	462	2.5	1.0	1.3	4.7	-3.3	7.6	2.7	-0.5	1.0	3.8	-3.3	7.6	1.4	-0.6	0.7	4.1	-0.6	0.0
	Production	1623	25	148	208	13569		2.4	4.4	6.1	17.7	1.7		2.5	3.6	5.8	16.7	1.7		1.5	3.0	5.5	17.0	4.7	
HR	Gross rev.	832	478	2123	4968	257	0	16.3	34.1	17.0	0.8	1.1		15.9	33.9	16.8	-4.3	0.5		17.8	34.3	17.0	0.9	4.0	
	Area	547	124	69	55	319	25	0.1	0.6	0.4	0.5	-6.5	75.8	0.3	0.9	-0.1	-1.6	-6.8	79.5	0.1	0.2	0.3	0.4	-3.4	39.0
	Production	3452	308	162	215	2539		0.8	2.3	11.9	12.4	10.7		1.2	2.6	11.4	10.2	10.4		0.8	1.9	11.7	12.2	13.7	
KO	Gross rev.	661	1340	3236	4781	364	0	7.6	-8.9	4.5	2.3	-58.2		6.4	-14.6	4.1	-1.0	-58.3		8.7	-7.3	4.0	2.4	-1.9	
	Area	151	1	3	23	317	41	2.8	6.4	-3.7	2.7	-6.9	41.6	3.0	6.3	-4.0	1.3	-6.7	40.2	0.2	3.5	0.5	2.0	-0.2	0.0
	Production	680	2	12	75	4841		4.1	6.0	0.1	12.2	-5.7		4.2	5.8	-0.2	10.5	-5.5		1.4	3.5	4.3	11.5	1.4	
MO	Gross rev.	461	0	4534	7916	281	0	16.1		-3.3	-9.1	-69.3		15.3		-6.0	-14.3	-69.4		17.5		-3.2	-9.1	-24.3	
	Area	4	0	12	20	477	21	36.8		1.0	-3.5	-4.1	89.5	36.3		0.6	-5.7	-4.2	93.7	28.0		0.7	-3.8	-0.1	0.0
	Production	11	0	47	106	6586		40.8		3.6	0.8	-2.1		40.3		3.1	-1.5	-2.2		31.8		3.3	0.5	2.0	
CS	Gross rev.	597	462	2253	1816	382	0	19.2	24.0	12.3	27.5	-14.9		20.2	23.8	14.0	32.0	-14.7		20.8	24.1	12.4	27.8	5.0	
	Area	1821	436	388	310	1850	303	-0.7	-1.5	1.3	9.5	-0.8	0.0	-1.0	-1.9	1.6	11.3	-0.8	0.0	-1.0	-1.6	1.4	9.2	-0.5	0.0
	Production	9039	1016	1079	767	20120		-0.3	-0.2	7.3	25.5	3.8		-0.5	-0.5	7.6	28.0	3.8		-0.5	-0.3	7.4	25.2	4.2	
MK	Gross rev.	698	724	3626	6757	146	0	-4.7	-3.5	5.7	-15.5	-39.1		-9.4	-9.9	6.8	-22.9	-39.4		-3.8	-3.3	5.7	-15.4	-39.1	
	Area	159	16	58	57	916	60	0.4	12.3	1.6	-2.6	-2.7	38.7	0.6	15.7	2.0	-5.0	-2.7	38.7	0.6	11.4	1.5	-2.6	-2.8	38.9
	Production	583	22	246	250	5881		3.8	18.5	4.4	-0.7	7.1		4.3	22.4	5.0	-4.4	7.2		4.0	17.4	4.4	-0.7	7.1	
WB	Gross rev.	670	491	2553	7714	322	0	14.3	23.2	9.2	-0.1	-30.2		14.1	22.2	9.9	-0.7	-30.3		15.8	23.2	9.2	0.1	-9.4	
	Area	3115	604	613	646	5825	1236	0.2	-0.7	1.2	5.0	-2.7	9.1	0.1	-0.9	1.3	5.2	-2.7	9.2	-0.4	-0.9	1.2	4.7	-0.9	2.7
	Production	15845	1393	1810	5007	0		0.8	0.7	6.8	5.6			0.8	0.6	7.0	5.6			0.3	0.5	6.9	5.5		

From Table 51, about 50% of demand for Cereals is for feed purposes which declines due to the linkages to animal products and thus explains why cereal demand is declining under WB and WB-CONV in all Western Balkan countries except Albania (and TFYR Macedonia under WB-CONV) in spite of cereal prices also decreasing. This decline in demand is partly or completely eliminated under WB-EXPIRY showing the importance of the quota system for the impact analysis. Declining demand and moderate increases in supply combine to give a decline in Western Balkan net imports of Cereals after accession which exerts a small downward impact on the EU-27 prices (-0.2% under WB).

Most important crops in the perennial aggregate are 'Fruits' (Table 52). Prices are higher than EU prices except in Serbia and Albania and would therefore drop in most Western Balkan countries under scenario WB. Gross revenues would nonetheless develop more favourably due to the yield effects (and EU premiums for all crops). All else equal, these yield effects are larger in Croatia (+17.1 % for fruits) than in the Western Balkans region on average (+7.1 %) because accession is assumed five years earlier than for other countries and the technology transfer behind the catching up effects on yields has more time to operate. In Croatia as well as in all other Western Balkan regions (except Kosovo), fruit areas may be expected to expand. This, combined with increasing yields, implies a higher production (+17.7 % in Croatia, see Table 52). Demand is increasing in countries with strongly declining prices but it decreases in the most important market, Serbia. In TFYR Macedonia and Kosovo demand declines, in spite of 'Fruits' becoming slightly cheaper, because prices of vegetables are dropping even more (Table 53). Supply and demand changes together result in lower net imports in all Western Balkan countries.

The picture is quite similar for vegetables and potatoes. Except in Serbia and Albania prices are likely to drop markedly as a consequence of some convergence to EU prices. Yield effects would probably over-compensate the impacts of declining prices on production. Note that yields do not only have (strong) direct effects on production but also indirect ones via gross revenues and areas.

Declining prices are stimulating demand for vegetables and potatoes (Table 53). A non-negligible component of this demand is for seed potatoes. This link to supply explains why total demand is moderately growing in Serbia according to Table 55 (+4.8%, whereas food demand declines by 3.7%). Apart from TFYR Macedonia and Montenegro demand growth is smaller under WB than supply growth such that net exports would strongly increase by about 0.4 m t for the whole region. This is about half the impact from ARCOTRASS (2006), mainly because the Serbian vegetables prices have been revised upwards (original national prices were referring to processing rather than table qualities). Nonetheless prices in Serbia are very low (also according to FAO data) such that a strong expansion of this sector will be expected. This is reinforced with higher price convergence, but under WB-CONV TFYR Macedonia would also become a sizeable importer of vegetables and potatoes such that total net exports of the region would actually decline. Finally it may be noted that results for vegetables and potatoes are less sensitive to the presence or absence of milk quotas (scenario WB-EXPIRY).

Table 51: Market results for the Western Balkans scenarios: Cereals [quantities: 1000 t, prices: €/t]

	REF				WB				WB-CONV				WB-EXPIRY			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%
EU27	132	294693	278364	16328	-0.2	0.0	0.0	-0.7	0.2	-0.1	0.0	-1.7	-0.1	1.5	0.1	0.1
Albania	168	456.1	1086.2	-630.1	-4.8	5.4	0.8	-2.5	-6.7	5.6	1.3	-1.7	-4.4	-0.1	1.5	1.8
Bosnia-Herzegovina	158	1623.3	2552.3	-929.0	-6.2	2.4	-0.9	-6.7	-8.3	2.5	-0.7	-6.3	-5.9	0.9	0.9	-0.5
Croatia	132	3451.8	3866.8	-414.9	-3.5	0.8	-3.7	-41.6	-4.1	1.2	-4.0	-47.1	-3.0	0.5	-1.1	-20.0
Kosovo	147	679.9	567.0	112.9	-4.4	4.1	-0.6	27.7	-5.6	4.2	-0.5	28.1	-4.1	1.2	0.1	9.2
Montenegro	144	11.2	174.8	-163.6	-2.3	40.8	-4.9	-8.0	-3.0	40.3	-5.8	-9.0	-2.0	31.7	-2.8	-5.7
Serbia	120	9039.1	8136.4	902.7	1.1	-0.3	-2.7	22.1	2.1	-0.5	-2.9	21.7	1.7	-1.5	0.1	0.2
TFYR Macedonia	190	583.5	818.7	-235.2	-17.7	3.8	-0.3	-10.5	-22.4	4.3	0.4	-9.1	-17.4	3.7	1.2	-7.3
Western Balkan	132	15844.9	17202.1	-1357.2	-2.2	0.8	-2.3	-38.2	-2.4	0.8	-2.4	-38.9	-1.7	-0.5	0.0	-8.7

Table 52: Market results for the Western Balkans scenarios: Fruits [quantities: 1000 t, prices: €/t]

	REF				WB				WB-CONV				WB-EXPIRY			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%
EU27	494	44954	58010	-13055	-0.1	0.0	0.0	0.1	0.4	0.1	0.0	-0.2	-0.1	2.1	1.2	0.1
Albania	469	194.5	300.2	-105.7	0.7	3.4	0.4	-5.2	1.3	3.7	-0.1	-7.1	0.6	4.0	0.2	-7.5
Bosnia-Herzegovina	581	262.6	358.6	-96.0	-9.9	6.4	2.6	-7.7	-12.5	6.0	3.1	-5.0	-9.9	5.8	2.7	-6.7
Croatia	550	169.4	336.6	-167.2	-6.8	17.7	3.9	-10.0	-8.5	16.9	3.8	-9.5	-6.8	17.9	4.1	-10.4
Kosovo	521	17.6	114.6	-97.1	-3.0	1.3	-0.7	-1.1	-3.8	1.1	-1.3	-1.8	-3.0	4.0	-1.0	-2.3
Montenegro	709	37.5	47.1	-9.7	-11.3	8.9	2.7	-21.1	-14.8	8.5	3.6	-15.5	-11.2	8.6	3.2	-18.5
Serbia	439	1594.5	1419.8	174.7	0.7	8.8	-0.8	87.2	2.0	9.1	-1.3	93.5	0.7	9.2	-0.4	86.3
TFYR Macedonia	509	292.8	325.0	-32.1	-2.1	5.3	-7.2	-120.7	-2.1	5.7	-9.8	-150.8	-2.1	5.3	-6.9	-120.4
Western Balkan	476	2568.9	2901.9	-333.0	-1.9	8.3	-0.4	-67.3	-1.6	8.4	-0.9	-73.1	-1.9	8.6	-0.1	-67.5

Table 53: Market results for the Western Balkans scenarios: Vegetables and potatoes [quantities: 1000 t, prices: €/t]

	REF				WB				WB-CONV				WB-EXPIRY			
	Price	Production	Demand	Net trade	%	%	%	%	%	%	%	%	%	%	%	%
EU27	338	136633	139420	-2788	-0.2	-0.1	0.0	8.0	-1.1	0.8	0.4	-21.1	-0.2	1.2	1.1	7.7
Albania	341	874.4	929.7	-55.3	-0.9	5.1	2.6	-36.9	-1.9	4.6	3.4	-16.1	-0.9	4.2	1.9	-43.0
Bosnia-Herzegovina	361	699.1	714.5	-15.4	-5.3	17.2	5.5	-526.3	-7.1	16.2	6.2	-449.6	-5.2	16.6	5.6	-522.5
Croatia	471	405.3	513.0	-107.7	-20.1	19.3	11.9	-16.0	-26.3	15.5	13.3	5.1	-20.1	19.2	12.1	-17.9
Kosovo	428	251.2	270.1	-19.0	-7.6	10.5	6.0	-53.0	-10.5	8.8	8.1	-0.6	-7.6	9.8	5.7	-56.1
Montenegro	426	359.2	279.3	80.0	-14.1	0.8	5.0	-13.8	-19.0	-1.5	6.5	-29.4	-14.1	0.4	4.5	-12.6
Serbia	219	2344.4	2315.3	29.1	6.1	23.7	4.8	1525.0	9.8	26.4	4.7	1756.9	6.3	24.0	5.7	1476.4
TFYR Macedonia	490	672.1	535.6	136.5	-19.6	-7.6	16.5	-101.9	-27.1	-13.3	21.9	-151.3	-19.5	-7.8	16.8	-101.1
Western Balkan	329	5605.7	5557.5	48.2	-7.9	13.9	6.4	874.5	-9.9	13.6	7.4	732.5	-7.9	13.7	6.7	795.0

From the market results we may derive implications for taxpayer impacts, income and other welfare components. The taxpayer impacts (Table 54) are clearly dominated by EU premiums granted to Western Balkan countries. Comparing the estimated 'market related expenditure and direct payments' with the extrapolated Financial Framework, appropriations from EU Commission (2007d, p. 37) showed that these additional payments would be consistent with Financial Discipline such that no downward scaling of payments in the EU-27 would be necessary[43].

Table 54: Taxpayer impacts for the Western Balkans scenarios

	REF	WB	WB-CONV	WB-EXPIRY
	[m €]	[Δ to REF]	[Δ to REF]	[Δ to EXPIRY]
EAGGF total	52599.8	1027.6	1023.6	1037.4
Total premiums	41820.6	1027.9	1028.2	1028.4
Tariff revenues	385.6	0.0	0.1	0.0
Export refunds	366.8	1.9	-2.5	11.1
Other FEOGA	10026.8	-0.4	-0.4	-0.4
Tariff revenues	1314.0	-18.3	-39.6	-17.8
Taxpayer burden	51285.8	1045.9	1063.2	1055.2
EU27	51285.8	799.4	816.6	807.0
Albania	0.0	22.5	22.5	22.7
Bosnia-Herzegovina	0.0	34.0	34.0	34.3
Croatia	0.0	95.2	95.3	95.9
Kosovo	0.0	8.9	8.9	9.0
Montenegro	0.0	6.8	6.8	6.9
Serbia	0.0	60.2	60.2	60.6
TFYR Macedonia	0.0	18.8	18.8	19.0
Western Balkan	0.0	246.5	246.6	248.2

Minor reductions of tariff revenues would result from reduced imports of 'Sheep and goat meat' and some dairy products. The additional expenditure would be partly self-financed by Western Balkan countries through their contributions to the EU budget. These contributions have been estimated to be about 0.65% of GDP, in line with the 2004 data for Poland, Slovakia, and the Baltic countries. Before accession these contributions were zero, of course (column REF in Table 54).

In terms of income results we begin with a look at contributions to agricultural income, output, input, and opportunity cost for variable labour and capital. It may be seen in Table 55 that the whole Western Balkan region would gain about 1.2 b € in agricultural income with Serbia being the main beneficiary due to increasing prices for potatoes and vegetables (Table 55). Declining prices of potatoes and vegetables are also the largest contributor to losses for agriculture in the EU-27 under WB (- 216 million €). It should be explained that the income effects under accelerated price convergence in the EU-27 (+198 million €) are not entirely due to accession effects. For consistency, an accelerated price convergence has also been assumed for the NMS in this scenario and these effects are overlapping with hypothetical accession impacts if only Western Balkan countries benefitted from reduced transaction costs. However the modified impacts in Western Balkan countries are clearly related to key price changes: Serbia would benefit even more in the potatoes and vegetables sector whereas the high price regions like Croatia and TFYR Macedonia, but also Montenegro would see additional losses. Croatia would also face increased price pressure in the pork sector whereas Albania would benefit from stronger increases of sheep and goat prices. Montenegro is the only country likely to suffer income losses due to the fact that no other sector can compensate for the losses on potatoes and vegetables. In Kosovo, on the contrary, there would be some gains on 'Beef and 'Cereals' (due to higher production), which outweigh (small) losses from potatoes and vegetables. In terms of income results milk quotas may be seen to have only moderate

43 This assessment differs from ARCOTRASS (2006).

impacts. There are large differences between WB and WB-EXPIRY on agricultural output and input in Kosovo and Montenegro because 'Fodder' prices are stabilised, but these changes tend to cancel with respect to agricultural income.

The next Table 56 gives further insights on the main components of changes in agricultural output. Note that in addition to animal and plant output there is a small residual output and that the three crop groups shown are not even always the three largest groups but those most frequently affected. In most Western Balkan countries the animal sector is smaller than the crop sector and, apart from Albania, it is usually negatively affected from accession. A declining animal sector often brings 'Fodder' prices close to zero, but because 'Fodder' is booked both as an output and as an input, this drop has little impact on agricultural income. Cereals and 'potatoes and vegetables' may be seen to be key contributors to agricultural output changes apart from Albania.

Whereas agricultural income from Table 55 enters the welfare calculation below, it is also interesting and at least as relevant from an agricultural policy perspective to consider more traditional income measures like factor income per agricultural work unit (AWU). Factor income may be calculated quite simply as: Gross value added at basic prices (GVAD = agricultural output intermediate consumption from Table 55) less depreciation and other taxes (net of other subsidies), where components apart from GVAD have been maintained at their base year values for simplicity. Approximate estimates for initial values, projections and impacts for agricultural labour in Western Balkan countries are far more critical. As explained in Section 3.1 the reference run projection follows from various sources combined with the assumptions on the decline of agricultural labour in ARCOTRASS (2006). Given the data problems related to the initial values already, the expert assessments from ARCOTRASS (2006) on accession impacts seemed to be still the best estimates available, even though the results of this study on agricultural factor income differ to some extent from those obtained in ARCOTRASS (2006). Table 57 collects the income effects per AWU based on this approach.

Table 55: Components of agricultural income in the Western Balkans scenarios

	REF [m €]				WB [Δ to REF]				WB-CONV [Δ to REF]				WB-EXPIRY [Δ to EXPIRY]			
	agricultural output	intermediate consumption	labour & capital cost	agricultural income	agricultural output	intermediate consumption	labour & capital cost	agricultural income	agricultural output	intermediate consumption	labour & capital cost	agricultural income	agricultural output	intermediate consumption	labour & capital cost	agricultural income
EU27	375875	228304	38921	108650	-470.6	-187.3	-67.8	-215.6	182.0	-42.4	26.8	197.6	-407.6	-107.4	-77.1	-223.1
Albania	4387	2460	873	1054	90.9	-128.4	31.5	187.8	125.8	-129.7	30.9	224.6	177.4	6.5	6.7	164.2
Bosnia-Herzegovina	1247	643	211	393	-10.0	-162.3	14.7	137.7	-27.8	-163.3	11.6	123.9	-9.4	-136.2	11.5	115.3
Croatia	2018	1172	349	496	32.5	-66.9	9.2	90.2	-21.7	-71.2	3.1	46.3	14.9	-45.7	1.5	59.1
Kosovo	496	281	66	149	-32.0	-68.4	4.5	31.9	-34.6	-68.1	2.8	30.8	6.8	-17.7	0.3	24.2
Montenegro	444	280	26	138	-87.4	-78.9	-3.1	-5.4	-102.4	-79.7	-6.7	-15.9	-48.6	-41.9	-6.1	-0.6
Serbia	4524	2501	850	1173	630.2	-145.6	68.9	707.0	682.0	-146.1	84.1	744.0	665.1	-74.8	59.8	680.1
TFYR Macedonia	1029	666	112	251	-89.2	-84.9	-29.8	25.5	-128.4	-85.2	-42.3	-0.9	-92.0	-84.6	-28.9	21.6
Western Balkan	14145	8004	2487	3655	535.1	-735.4	95.8	1174.7	492.9	-743.4	83.5	1152.8	714.2	-394.4	44.7	1063.9

Table 56: Components of agricultural output in the Western Balkans scenarios

	REF [m €]						WB [Δ to REF]						WB-CONV [Δ to REF]						WB-EXPIRY [Δ to EXPIRY]					
	Agric. output	Animal output	Plant output	Fodder	Cereals	Potatoes & veget.	Agric. output	Animal output	Plant output	Fodder	Cereals	Potatoes & veget.	Agric. output	Animal output	Plant output	Fodder	Cereals	Potatoes & veget.	Agric. output	Animal output	Plant output	Fodder	Cereals	Potatoes & veget.
EU27	375875	131431	216266	34652	48267	47066	-471	-63	-408	-117	-69	-178	182	355	-146	-109	23	-154	-408	-97	-310	-73	-18	-170
Albania	4387	613	3739	309	74	298	91	38	29	-51	8	16	126	57	45	-52	7	11	177	32	121	47	4	13
Bosnia-Herzegovina	1247	334	902	226	242	252	-10	-4	-41	-87	14	33	-28	-3	-61	-88	9	25	-9	-19	-23	-64	12	31
Croatia	2018	1035	975	53	441	191	33	-117	142	17	76	-3	-22	-149	121	16	75	-23	15	-138	148	21	78	-3
Kosovo	496	171	322	105	96	108	-32	10	-46	-62	11	4	-35	13	-52	-62	10	-1	7	-10	14	0	8	3
Montenegro	444	118	310	99	2	153	-87	-10	-81	-61	1	-19	-102	-12	-93	-61	1	-30	-49	-15	-35	-15	1	-20
Serbia	4524	1484	2984	297	1048	513	630	-58	656	69	198	185	682	-72	722	70	206	224	665	-77	710	118	202	185
TFYR Macedonia	1029	191	818	108	106	330	-89	-9	-87	-31	-4	-82	-128	-11	-123	-32	-9	-119	-92	-11	-87	-32	-4	-82
Western Balkan	14145	3945	10050	1196	2009	1844	535	-150	573	-207	304	133	493	-177	558	-208	299	87	714	-238	847	74	302	128

Acknowledging the labour impacts of accession renders the income gains of Western Balkan countries even more impressive. Per capita income results improve in particular in Croatia and Montenegro. In the latter country negative impacts on total factor income would even turn into small income gains per capita which also applies without milk quotas but not with high price convergence. Remember that the high per capita income estimated for Montenegro in the reference run rests on official data[44] but may be acknowledged to be surprising. It would be inappropriate, therefore, to take the income losses in Montenegro as an irrelevant result because the true per capita income could be as low as in Serbia or even lower.

If the income effects from Table 55 (i.e. including opportunity costs for labour and capital) are combined with taxpayer impacts from Table 54 and supplemented with effects on processors (dairies and oil crushing industry) and final consumers, we obtain the complete welfare impacts of accession scenarios. These are clearly positive for Western Balkan countries as consumer gains alone would often more than outweigh the additional burden to the taxpayers in Western Balkan countries if these taxpayers have to contribute to the EU budget. The exceptions are the two countries where agriculture is likely to benefit strongly, namely Albania and Serbia. These impacts may be somewhat modified with higher price convergence or prior expiry of the milk quota system, but the welfare effects of accession are not very sensitive to these issues.

Again it should be warned that the strongly modified welfare effects in the EU-27 under high price convergence are not only due to accession but also due to a faster price convergence of the NMS to the Common Market prices. Further caveats are needed due to the partial nature of this welfare analysis: No attempt has been made to assess the advantages of trade creation between the EU-27 and the Western Balkans in the industry and services sectors. Also all rural development impacts and associated specific measures (pre accession aid) have been ignored as CAPSIM is of little help here and it seems more advisable to deal with those (numerous) issues that can be handled in a model. Furthermore we have to admit that all environmental impacts have been ignored just as the impacts on political stability in the region that might be expected under accession. Taking the latter into account it is highly probable that the conventional welfare losses for the EU-27, mainly resulting from EU premiums, can be considered the price to be paid in pursuance of higher political goals.

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44 Note that agricultural labour is given far higher according to Table 57 (17000 AWU) than in ARCOTRASS (2006), Table 3-1 (7000 people for total agro food employment).

Table 57: Factor income per AWU in the Western Balkans scenarios

	REF [m €]					WB [% to REF]			WB-CONV [% to REF]			WB-EXPIRY [% to EXPIRY]		
	GVAD	Depreciation & other net taxes	Factor income	Agric. labour	Factor inc. / head	Factor income	Agric. labour	Factor inc. / head	Factor income	Agric. labour	Factor inc. / head	Factor income	Agric. labour	Factor inc. / head
	[m €]	[m €]	[m €]	[1000 AWU]	[€ / AWU]	[% to REF]	[% to REF]	[% to REF]	[% to REF]	[% to REF]	[% to REF]	[% to EXPIRY]	[% to EXPIRY]	[% to EXPIRY]
EU27	147571	26820	120752	9324	12950	-0.2	0.0	-0.2	0.2	0.0	0.2	-0.3	0.0	-0.3
Albania	1927	184	1744	428	4072	12.6	-3.8	17.0	14.7	-3.8	19.2	9.8	-3.8	14.2
Bosnia-Herzegovina	604	70	533	134	3992	28.6	-2.5	31.8	25.4	-2.5	28.6	23.7	-2.5	26.9
Croatia	845	127	719	162	4434	13.8	-8.6	24.5	6.9	-8.6	16.9	8.5	-8.6	18.7
Kosovo	215	29	187	53	3556	19.5	-4.0	24.5	18.0	-4.0	22.9	13.1	-4.0	17.8
Montenegro	164	24	139	17	8350	-6.1	-8.4	2.4	-16.3	-8.4	-8.6	-4.8	-8.4	3.9
Serbia	2023	279	1744	453	3853	44.5	-5.1	52.3	47.5	-5.1	55.5	42.4	-5.1	50.1
TFYR Macedonia	363	67	296	86	3446	-1.4	-5.9	4.8	-14.6	-5.9	-9.2	-2.5	-5.9	3.7
Western Balkan	6142	780	5362	1332	4026	23.7	-4.9	30.1	23.1	-4.9	29.4	20.7	-4.9	26.9

Table 58: Welfare effects of the Western Balkans scenarios

	WB [Δ to REF]					WB-CONV [Δ to REF]					WB-EXPIRY [Δ to EXPIRY]				
	Agriculture	Processors	Taxpayers	Consumers	Welfare	Agriculture	Processors	Taxpayers	Consumers	Welfare	Agriculture	Processors	Taxpayers	Consumers	Welfare
EU27	-216	-41	-799	250	-806	198	-38	-817	992	335	-223	-71	-807	300	-801
Albania	188	10	-23	-9	166	225	14	-23	-17	199	164	17	-23	-5	154
Bosnia-Herzegovina	138	8	-34	38	149	124	11	-34	50	150	115	17	-34	50	148
Croatia	90	12	-95	174	181	46	10	-95	223	184	59	40	-96	180	183
Kosovo	32	1	-9	7	30	31	1	-9	8	31	24	4	-9	21	40
Montenegro	-5	0	-7	28	16	-16	0	-7	37	14	-1	2	-7	36	30
Serbia	707	33	-60	-2	677	744	38	-60	-9	713	680	58	-61	11	689
TFYR Macedonia	25	-2	-19	85	90	-1	-3	-19	108	85	22	0	-19	88	90
Western Balkan	1175	61	-246	320	1310	1153	70	-247	400	1376	1064	138	-248	380	1334

6 CONCLUSIONS

This study provided an agricultural sector analysis on two topics, the ongoing EU dairy reform and a potential accession of Western Balkan countries to the EU. The analysis was carried out with the Common Agricultural Policy SIMulation (CAPSIM) model which is a comparative static, partial equilibrium modelling tool covering the agricultural sector of the EU Member States (MS). CAPSIM provides a detailed coverage of dairy commodities for the EU-27 with cow milk and nine dairy processed products. Results are simulated for 2004, 2014, and 2020 whereas the expiry is hypothesised (or scheduled) five years earlier. This time lag between hypothetical policy implementation and simulation acknowledges an adjustment period of five years such that a comparative static modelling tool may be expected to identify the medium run impacts. Sensitivity analyses relevant for the dairy scenarios have been carried out on the choice of milk quota rents, on the presence or absence of export refunds, and finally on the type of intra EU price transmission. With respect to the accession scenarios a sensitivity analysis has been carried out on the strength of price convergence and on the presence or absence of the milk quota system.

Key results of the main quota expiry scenario for 2020 are that milk production would increase by 3.1% in the EU-27 whereas milk prices would drop by 7.3%. These impacts would differ by MS and tend to be stronger where the initial quota rents were estimated to be higher. In fact it turned out that the regional pattern simulated is strongly influenced by the specification of initial quota rents which reflect differences in marginal cost and thus behavioural functions on the supply side. For example Spain and The Netherlands, the two countries with the highest quota rents, are showing the larger expansion in production (e.g. 11% increase in cow milk production in 2020 as compared to the reference run). Market impacts for derived dairy products are usually an increase in supply associated with declining prices, increased demand, and net exports increasing relative to the reference run. The impacts partly depend on whether market management based on variable export refunds would dampen the price drop or not.

In the standard case this market management is still relevant for 'Butter' which would limit the price change to 0.6%. In the sensitivity analysis without export subsidies the drop in 'Butter' prices would be 4.3 % which is similar to 'Skimmed milk powder'. 'Cheese' and fresh milk products would see somewhat smaller price changes (-2.7% and -1.8%). Declining prices evidently benefit final consumers at the expense of producers. The balance of welfare effects is small and partly dependent on budgetary impacts. The quota expiry would increase 'Butter' refunds by about 165 million €. At the same time imports would decline which also holds for other dairy products and could lead to a loss of tariff revenues of about 190 million €.

It should be acknowledged that intrasectoral efficiency gains of quota expiry which follow from non-zero transaction costs in quota trade in the reference run are not captured in the CAPSIM analysis. Furthermore structural change over time may increase after the expiry of quotas. On the other hand environmental impacts, positive and negative, are also neglected. As may be expected the sensitivity analysis confirms that all impacts are increasing if higher quota rents had been chosen.

For this study the default quota rents have been taken from the specialised dairy model European Dairy Industry Model (EDIM). Furthermore supply and final demand elasticities related to the dairy sector have been cross checked with EDIM to ease model comparisons and potentially to provide complementary and matching information from CAPSIM that may supplement the earlier EDIM results. However, it turned out that in spite of sharing key parameters, large scale models are sufficiently complex to permit diverging results in some areas even though some elements have been aligned. For example, even though the signs of many impacts are the same in CAPSIM and EDIM, including a small negative welfare balance, magnitudes differ nonetheless. In general EDIM gave a somewhat stronger production growth (+5.2% rather than +3.1%) and raw milk price drop (-10.7% rather than -7.3%) for the EU-27.

Methodological differences in the description of the dairy industry have been mentioned already and do not seem to be fundamental. The detailed description of the cattle complex including calves and nutrient balances and explicit representation of 'Fodder' markets may endogenously dampen supply response in CAPSIM in spite of similar supply elasticities for all else equal changes. However another methodological difference rests certainly in the representation of external trade. CAPSIM has simple aggregate behavioural functions for exports and imports from Rest of the World (ROW) which imply heterogeneity of products, whereas EDIM basically assumes that products are homogeneous at the given level of disaggregation which may have led to stronger price impacts. It is nonetheless reassuring to note that in qualitative terms and many quantitative relative indicators the two modelling systems gave quite consistent results.

Accession effects in the Western Balkan countries would originate in convergence to EU prices, in technology transfer which would increase yields, and in CAP components introduced on the Western Balkan like milk quotas or decoupled payments. In the animal sector prices are usually higher than in the EU, apart from 'Sheep and goat meat', such that animal production is likely to experience increased competition with the EU-27. In the crop sector there are some products with fairly low prices in some Western Balkan countries (e.g. potatoes and vegetables in Serbia) such that these sectors offer some opportunity for Western Balkan producers to compete on EU markets. Agricultural income per head is projected to increase by about 30% on the Western Balkans with the mayor contribution coming from the total income change which is supported by an accelerated intersectoral reallocation of labour after accession: the effect on labour estimated to be about 5%. Welfare effects were also estimated to be positive even though quite heterogeneous. There would be a total welfare gain to the region of 1.3 b € which materialises to a large extent in Serbia (+0.7 b €). These favourable impacts are likely to improve further if accession impacts on services and industry had been included in the analysis and if Rural Development measures had been covered.

The CAPSIM model under this study has been further updated in order to focus on the EU dairy market and consider the further EU enlargement. CAPSIM is able to depict with great details different types of analysis, the first type focusing on a specific agricultural market with a complex policy environment and the second type focusing on the EU accession of Western Balkans not yet analysed in an agricultural sector wide partial equilibrium model.

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Abstract

This study describes a multicommodity analysis focusing on two EU relevant agricultural policy aspects: reform of EU dairy market following the so-called Common Agricultural Policy (CAP) 'Health Check' (HC) and the potential accession of Western Balkan countries to the European Union. The analysis is carried out using the Common Agricultural Policy SIMulation (CAPSIM) model developed by EuroCARE and the University of Bonn on behalf of DG ESTAT. Key results of the main quota expiry scenario for 2020 are that milk production would increase by 3.1% in the EU-27 whereas milk prices would drop by 7.3%. Accession effects in the Western Balkan countries would originate in some convergence to EU prices, in technology transfer which would increase yields, and in CAP components introduced on the Western Balkan like milk quotas or decoupled payments.

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