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Implications of EU Accession of Ten New Members

The Copenhagen Agreement

By

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Abstract

At the Copenhagen European Council Meeting in December 2002 the European Union (EU) decided to enlarge the EU with ten new Member States. As anticipated negotiations on the appropriations for agriculture, structural operations and administration for the new Member States were difficult but a comprise was reached.

In this study we present the economic impacts of the Accession for each of the EU-25 Member States. Results include impacts for agricultural production and trade, the EU budget, and economic welfare. The analysis shows that supply responses will be very different across acceding countries, and that there is solid potential for increasing agricultural production in a number of these countries. There will be marginal negative effects on EU-15 members' agricultural production.

Related to the WTO discussion, the enlargement of the EU seems primarily to be an intra European (distributional) story with minor impacts on countries outside Europe. It is found that the overall economic welfare losses in EU-15 member countries are minimal, despite increases in their budgetary contributions. Therefore in economic terms the enlargement of the EU with the CEECs is affordable even within the existing design of the Common Agricultural Policy. This does not, however, remove the need for reforming the CAP along the lines, as recently proposed by the EU Commission – reforms that would enhance economic efficiency in the enlarged European Union as well as being a constructive step towards compromise in WTO negotiations.

Keywords: CGE modelling, Common Agricultural Policy, EU Enlargement, Copenhagen Agreement, GTAP.

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1. Background

At the Copenhagen European Council Meeting in December 2002 the European Union (EU) decided to enlarge the EU with ten new Member States, that is with Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic and Slovenia. As expected the negotiations with respect to the appropriations for commitments for agriculture, structural operations, internal policies and administration for the new Member States were hard but a comprise was reached with respect to reference quantities, unit payments as well as for the transitional arrangements in general.

The decision to enlarge the EU is a very important step in shaping the future political, institutional and economic structures of Europe. The impacts on growth, the economic structures and the international trade pattern will all be affected by the specific agreements reached as well as the economic situation in the longer run will depend on the future design of the CAP[2]. The discussions of the future design of the Common Agricultural Policy has also become quite a difficult puzzle to solve as the room of manoeuvring in the reform discussion as well as the EU positioning in the international trade negotiations under the auspice of the World Trade Organisation will clearly be affected by the accession of 10 new Member States.

To our knowledge there are only very limited, if any, systematic and comprehensive quantitative studies of the implication of the accession agreement reached in 2002 for the production of and trade in agricultural commodities within the enlarged European Union (as well as between the Member States and non-member regions). The purpose of this paper is therefore to describe and analyse the economic implications of the accession agreement for each of the 25 Member States using a specifically tailored global general equilibrium model and database. The GTAP model and database have been our point of departure in which the specifics of the agreement and the Common Agricultural Policy (CAP) is explicitly represented.

The study is a continuation of our earlier work in this area. For the first time each of the new member countries are explicitly included as well as we take into account the full implementation of the Agenda 2000 and the EU trade preferences towards the less developed African countries. Our representation of the EU milk quota system has also been adjusted with important implications for the assumed competitiveness of each of the European countries.

The paper starts with a brief overview of the agreement reached on the EU enlargement in Copenhagen on December 13 2002 followed by the analysis of the economic implications of that agreement in the old and new member states. The scenarios consist of two distinct parts. First, the construction of a baseline scenario for the period 1997 to 2013, and second, an enlargement scenario in which the EU's CAP is extended to the ten new member countries in concordance with the final accession agreement reached in Copenhagen.

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[2] See Baker (2002) for a presentation and discussion of the current status of the enlargement in the agricultural sector and the key variables in the enlargement process, including convergence and incentives within an enlarged European Union.

2. The Copenhagen Agreement

The European Council of December 2002 concluded Denmark's tenancy of the revolving EU Presidency. On 13 December 2002 it featured a summit meeting in Copenhagen between the EU on one hand and prospective EU members on the other. Agreement was reached, and eight CEECs, Cyprus and Malta will accede to the EU in the so-called "Eastern Enlargement", scheduled for 1. May 2004.

The previous Danish EU Presidency (1993) had initiated the Eastern Enlargement, identifying necessary legislative, economic and political preparation by the CEECs that became known as "Copenhagen criteria". During the decade 1993-2002 CEECs set about satisfying Copenhagen Criteria, the most demanding of which was the adoption and implementation of the 33 Chapters of the *acquis communitaire*, effectively the law of the EU. Agriculture (chapter 7) presented the most difficulties, and required the greatest changes in organization, institutions, and behaviour in the farming and food industries. In the EU, 1993-2002 featured the inception of the Single Market, accession by three new member states, the introduction of the Single Currency, and a number of the reforms of the Common Agricultural Policy. These developments in the EU's structures and institutions influenced the path taken towards the Eastern Enlargement, particularly in the context of agriculture

The late 1990s produced various trade and aid arrangements between CEECs and the EU that were designed to promote integration. Trade protocols attached to Association Agreements provided a means for steadily increasing mutual market access, although agricultural products were featured only in their latter stages. EU aid took two simultaneous and separate approaches, the first being assistance with *acquis* adoption (e.g. under the Phare program), targeting institutional reform and training for future adoption of the CAP. No financial support to agriculture was involved. In the second approach, the SAPARD program established the institutional arrangements for regional development aid. Unlike Phare, SAPARD also provided funding.

While adopting the *acquis*, during the 1990s most CEECs established and expanded agricultural policy regimes that were at best poorly related to, and at worst contradictory to, the CAP. The challenges of economic transition, the disappearance of centrally-planned trade patterns, and accommodation of the new rural vote all contributed to the emergence of a considerable range of agricultural policies. These policies remain in place today.

The CAP as an influence on the Eastern Enlargement
In 1999 the (Berlin) European Council articulated initiatives in both CAP reform and the Eastern Enlargement. They reaffirmed commitment to production quotas and to direct payments, under the "Agenda 2000" reform that consolidated the earlier MacSharry CAP reforms. At the same time, a 2-stage EU enlargement plan was revealed, involving 6 new CEEC members in 2002. A budget allocation was established, known as "the financial framework" or "Berlin guidelines". Crucially, the financial framework assumed that CEEC farmers would receive no direct payments. It allocated sums for regional development and agriculture for the five years 2002-2006, cf. Table 1. Another significant outcome from Berlin was that CEECs received confirmation that that production quotas would apply to them after the Eastern Enlargement. Quota amounts thus became key variables for CEECs' future negotiation, despite the EU's supposedly clear procedures for their calculation.

Concerns within the EU about the Eastern Enlargement concerned both the CEECs' institutional capacities for operating EU policy instruments, and the fiscal cost of supporting CEEC farmers. As a consequence, two separate strands of the enlargement process appeared. The first emphasized the adoption of the *acquis*, while the second centred on the eligibility of CEECs for support under CAP instruments. The adoption of the *acquis* involved the complex programs and planning, "screening", reporting and monitoring that had begun in the mid-1990s. Conversely, CEECs' eligibility for CAP instruments required an *ad hoc* negotiation process. However, until late 2002 the EU had no unified position on eligibility matters and negotiations could not proceed. Uncertainty over the future shape of the CAP provided the CEECs with what was frequently described as a "moving target".

Enlargement in 2002 proved infeasible, and more than 6 CEECs appeared ready for accession. A 2004 enlargement with 8 CEECs (plus Cyprus and Malta) was embraced by the EU, in that the proposed expansion of the CAP could/should be financed within the financial framework laid down by the Agenda 2000 CAP reform at the Berlin Summit meeting in March 1999.

At the Berlin Summit agreement the EU leaders agreed to stabilise EU spending on CAP expenditures (excluding rural development) at 40.5 billion € (in 1999 prices) a year over the period 2000 – 2006, plus 2 per cent yearly addition to adjust for inflation. The EU leaders extended this agreement in October 2002, to cover the period 2007 to 2013, in which the adjustment for inflation was fixed to 1 per cent per year. It is within this financial framework that the European Commission has to finance direct payments and market expenditures given to farmers in an enlarged EU comprised of 25 member countries.

Issues under negotiation
During 2000-2002, as adoption of the *acquis* proceeded, CEECs increasingly demanded eligibility for direct payments, and accordingly proposed base areas and animal numbers, and reference yields. Disappointing EU-CEEC trade performance had further influenced CEECs' domestic policy agendas and some CEECs proposed transitional trade barriers within the enlarged EU. Similarly, bans on foreign ownership of farmland were widely demanded. Several CEECs introduced tariff regimes that violated Association Agreements as well as WTO commitments.

By early 2002 most CEECs had satisfied the EU that the *acquis* had been adopted in most areas except Agriculture. Outstanding issues in (or related to) agriculture included institutional arrangements such as financial controls, databases and record keeping, and the organizations involved in management of commodity sectors. Related concerns formally voiced by the EU involved aspects of border controls, animal identification and land parcel registration: all essential for CAP operation.

In a March 2002 communication, the European Commission offered a comprehensive financial and structural plan for agricultural aspects of the enlargement. For the first time direct payments were discussed, in the form of a compromise that specified partial eligibility for CEEC farmers. It also detailed the reference quantities, areas and animal numbers considered valid for direct payments. Similarly, the EU's calculations of CEECs' quota levels were presented. CEECs were offered a simplified implementation procedure for direct payments that was not tied to CAP program commodities, and did not require set aside, for the first few years after accession. Partial eligibility entailed payments to CEECs' farmers at a level representing a small proportion of that paid to existing EU members. It was proposed that that level (25% in 2004) would steadily increase over a 10-year period to parity.

Quota levels and reference amounts for direct payments were set by the EU at levels far below those proposed by CEECs. CEECs' numbers were generally based on perceptions of 1980s' production and other criteria such as the anticipated transfer of volumes from subsistence to marketed production. Poland's proposal even featured a 2-stage introduction of dairy quota, with an increase at 2011.

In mid-2002 it was revealed that the Czech Republic and Slovenia would become net contributors to the EU budget immediately after the enlargement. Expanded direct payments eligibility was rejected in favour of a political fix that led to the 2004 accession date being specified at 1 May, so that new members would avoid most payments obligations earlier in the year.

During 2002 CEECs lobbied first for 100% eligibility for direct payments, then later for increases on the initial offer. Some CEECs that already operated CAP-like direct payments programmes lobbied for the right to continue them under CAP funding. In November 2002 the EU introduced the idea that CEECs would be permitted to "top up" their direct payments from national budgets, as well as from (up to 20% of) EAGGF regional development funds in 2004-2006. Topping up allowed the payment to CEECs farmers to increase to 40% of that made in existing member states in the first year, with steady increases to follow. Also in November 2002, the EU raised several times the quota and reference quantities allocated to CEECs.

During 2002, and particularly late 2002, EU members further debated the future of the CAP. Their commitment to the financial framework was emphasized, at the same time as new reforms and future budgetary limits were discussed. In the same period, CEECs met with the EU in many formal and less formal fora. In these meetings, adoption of the *acquis* received far less emphasis than the negotiation of CEEC eligibility for CAP payments: direct payments; reference numbers for those direct payments and quota levels.

By late 2002, all CEECs have satisfied Copenhagen criteria and all attention was focused on financial details. A curious twist was that although almost all CEECs had reached agreement with the EU before the summit, they had also retained the right to enjoy any additional concessions to countries reaching agreement later in negotiations. Primarily, this referred to Poland's intense efforts to broaden eligibility, raise quota levels and secure additional financial resources.

Conclusions reached
Quota
Final quota amounts allocated to CEECs were not changed at the Copenhagen summit. Leading up to the summit, quota volumes had been repeatedly raised, arriving at 70-100% the volumes claimed by CEECs for milk, 60-90% for A and B sugar quota, but much lower levels for potato starch.

Reference numbers for direct payments
As for quotas, CEECs' proposals for eligible quantities reflected 1980s' production levels. An additional problem for CEECs was that their production systems (particularly in beef, and fodder production) were sufficiently different from those in the EU that definitions became difficult to equate. In the months before the summit, eligible areas and animal numbers rose steadily for almost all CEECs. These were not changed at the summit. CEECs were allocated 60-100% of their proposed base areas at 70-100% of their proposed reference yields. In general, the larger

CEECs (Poland, Hungary, Slovakia and the Czech Republic) were allocated quantities for arable crops close to those proposed. For beef, allocated numbers varied substantially amongst livestock classes. The smaller CEECs tended to receive allocations 70-100% of those requested while the larger CEECs fared less well.

Direct payment levels
At the Copenhagen summit the EU conceded greater scope for CEECs to top up direct payments. The maximum allowable proportion of existing EU levels was raised from 40% (the November proposal) to 55% for the first year. Two options were approved at the Copenhagen summit. Both maintained the budgetary constraint that CAP funds would be allocated only up to a level of 25% of that paid to farmers in existing EU states. Both also required that, whatever topping up occurred, in no case would CEECs' payments exceed those received in existing member states.

In the first option, CEECs could top up EU payments by up to 30%, for a total of 55%, 60% and 65% of the EU rate in the first three years. Such payments could be based on simplified schemes.

In the second option, existing direct payments schemes could be maintained, and topped up by 10%.

At the Copenhagen summit, restrictions on the use of rural development funds were also maintained, with slight modifications: either a flat maximum rate of 20% of rural development funds allowed to be diverted; or an initial rate of 25% in 2004, declining to 20% and 15% in 2005 and 2006. Under both options, diversions from rural development funds could be made only in the years 2004-2006 and may only represent a topping up to 40% of EU levels.

Foreign ownership of farmland
According to agreements reached during 2000-2002, foreigners will not be permitted to own farmland in Hungary, Czech Republic, Slovakia and Bulgaria for a period of 7 years after the Eastern Enlargement. For Poland, the moratorium is for 12 years. Waivers are available to EU citizens resident in a specified CEEC for a period of three years and who are "self-employed farmers". At the Copenhagen summit an additional safeguard arrangement was also agreed whereby moratoria can be extended for 3 years in those countries (other than Poland), and introduced in others, in exceptional cases.

Upgrading of food processing plant
Transitional arrangements for upgrading food-processing establishments were agreed during 2000-2002. Upgrading can be carried out over a period of up to three years following accession for red meat, dairy and fish establishments in Lithuania and Latvia. For Hungary and the Czech Republic, 2006 has been agreed as a deadline for upgrading some red meat and other animal product processing facilities. This agreement was not changed during the Copenhagen summit.

Upgrading of animal housing
Recently constructed poultry housing of a specified design that is not compliant with EU directives can be maintained in the Czech Republic, Slovenia, Hungary and Lithuania until 2009. This agreement was not changed during the Copenhagen summit.

State aids in agriculture
For several CEECs, transitional arrangements for state aids had been agreed during 2000-2002. Slovenia has five years in which to remove its payments to pumpkin seed oil producers and Slovakia has a two-year easement on aids paid for commodity warehouse operations. At the

Copenhagen summit it was agreed that Latvia could continue (for five years) a decoupled farm income support program in several sectors that will receive less support under the CAP than they enjoy at the time of the enlargement.

Excise duties
Selected countries were permitted to maintain individual excise tax regimes that affected or exempted farm households. This primarily referred to small-scale manufacture of alcoholic drinks.

Structural funds
No new structural funds were allocated at the Copenhagen summit, but earlier EU commitments were upheld. Significantly, CEECs' co-financing requirement for selected rural development measures were reduced to 20%, and sums were made available to encourage commercialisation of subsistence farms.

Cash flow facilities
The Copenhagen summit established a special cash flow facility of €1 billion. This was allocated amongst CEECs, Poland receiving the largest share at €443 million.

Poland and the Czech Republic were granted an additional facility whereby funds were transferred from future (2005 and 2006) EU structural funds to a cash flow facility available in those years. This amounts to €1 billion for Poland and €100 million for the Czech Republic, to be deducted from their future structural funds allocations.

Other payments
A variety of small payments were awarded to CEECs for a variety of reasons. The Czech Republic and Slovenia were allocated small lump sums not clearly explained in the proceedings, but likely to be associated with offsetting first year contributions to the central budget. Other countries received miscellaneous sums labelled "rural development".

3. The Economic Implications of the Copenhagen Agreement

Having described the decisions reached the following analysis aims at describing quantitatively the economic impacts of the EU enlargement. Before analysing this, a baseline for the period 1997-2013 is constructed. The baseline provides a benchmark against which the EU enlargement is compared. It features projections of the world economy, cf. Table 1 below, plus incorporation of the effects of changes in the CAP as outlined in the Agenda 2000 reform, 'Everything But Arms' trade access for Less Developed Countries in Africa, and changes in tariff-equivalent rates between the ten central and Eastern European Countries and the EU for some commodities to reflect applied rates in the year 2002, cf. Box 1.

The projection of the world economy using the exogenous assumptions listed in Table 1 is important in shaping the baseline scenario. The GTAP model determines changes in output through both an expansionary and a substitution effect in each country/region of the model. The expansionary effect represents the effects of growth in domestic and foreign demand shaped by income and population growth and the assumed income elasticities, while the substitution effect reflects the changes in competitiveness in each country/region shaped by changes in relative total factor productivity, cost of production as well as any policy changes.

Therefore the relative growth rates between each country/region for GDP, population, labour, capital and total factor productivity play an import role in determining the relative growth in output of the 24 commodities listed in Appendix C when projecting the world economy from 1997 to 2013.

The policy changes modelled in the baseline only reflect changes made in the EU. All other countries domestic support as well as border projection does not change during the baseline period.

Box 1. Assumptions shaping the baseline 1997-2013

<table>
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Projections
Shocks to GDP, factor endowments and population
Sector specific shocks to total factor productivity
Capital stocks endogenously determined

Uruguay Round Agreement
If export subsidy commitment (in value terms) is binding, the export subsidy rate is reduced

Agenda 2000 Reform
All direct payments are deflated by 2 per cent per year (max budgetary outlays fixed in nominal terms)
Hectare and livestock premiums and milk quota adjusted according to reform
Intervention prices reduced (import tariff and export subsidy reductions)
Blair House Agreement concerning oilseeds abolished
National Envelopes and new premiums introduced
Set aside reflects the 10 per cent requirement
Sugar quota unchanged

Association Agreements
EU Preferential market access for bovine meat products and other meat products from the CEECs

Everything But Arms
All EU tariff rates reduced to zero on imports from Malawi, Mozambique, Tanzania, Zambia, Uganda, and the two GTAP aggregate regions Other Southern Africa and the Rest of sub-Saharan Africa.

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Table 1. Baseline, exogenous assumptions, annual growth rates, 1997-2013

	GDP	Pop.	Labour force		Total factor productivity			Capital[*]
			Skilled	Unskil.	Agricul.	Industry	Services	
Belgium/Luxemborg	2.42	0.07	-0.11	-0.02	1.40	1.00	0.50	2.87
Denmark	2.38	0.08	-0.20	-0.11	1.40	1.00	0.50	2.69
Germany	1.97	-0.21	-0.47	-0.38	1.40	1.00	0.50	2.23
Greece	3.00	-0.08	-0.14	-0.05	1.40	1.00	0.50	5.27
Spain	3.19	-0.15	-0.21	-0.12	1.40	1.00	0.50	4.84
France	2.63	0.25	0.19	0.28	1.40	1.00	0.50	2.04
Ireland	6.12	0.65	0.69	0.78	1.75	1.25	0.63	6.65
Italy	2.39	-0.28	-0.50	-0.41	1.40	1.00	0.50	1.32
Netherlands	3.16	0.27	-0.06	0.03	1.40	1.00	0.50	2.61
Austria	2.76	-0.04	-0.06	0.03	1.40	1.00	0.50	3.41
Portugal	3.00	-0.06	-0.07	0.02	1.40	1.00	0.50	5.09
Finland	3.60	0.14	-0.07	0.02	1.40	1.00	0.50	3.21
Sweden	2.93	-0.13	0.04	0.13	1.40	1.00	0.50	2.65
United Kingdom	2.52	0.02	0.09	0.18	1.40	1.00	0.50	2.66
Bulgaria	3.64	-0.69	-0.21	-0.44	0.70	0.50	0.25	0.24
Cyprus/Malta	2.85	0.62	0.94	0.71	1.40	1.00	0.50	3.60
Czech Republic	3.18	-0.22	0.24	0.00	1.40	1.00	0.50	2.69
Estonia	4.16	-0.52	0.13	-0.10	1.40	1.00	0.50	2.82
Hungary	4.70	-0.40	-0.28	-0.51	1.40	1.00	0.50	5.45
Latvia	4.11	-0.77	0.05	-0.19	1.40	1.00	0.50	1.23
Lithuania	3.12	-0.14	0.43	0.20	1.40	1.00	0.50	1.65
Poland	3.95	0.04	0.56	0.33	1.40	1.00	0.50	4.76
Romania	2.35	-0.30	0.23	-0.01	0.70	0.50	0.25	1.12
Slovakia	3.73	0.10	0.75	0.51	1.40	1.00	0.50	1.73
Slovenia	4.05	-0.16	0.09	-0.14	1.40	1.00	0.50	1.73
North Africa	4.17	1.56	3.32	2.33	0.70	0.50	0.25	3.87
Botswana	4.32	1.00	10.32	3.19	0.70	0.50	0.25	8.49
Other Southern Africa	2.83	1.17	2.67	2.39	0.70	0.50	0.25	2.12
Malawi	3.06	2.24	5.74	2.83	0.70	0.50	0.25	4.23
Mozambique	6.88	2.01	4.72	2.74	1.05	0.75	0.38	1.42
Tanzania	5.37	2.02	-2.94	3.10	1.05	0.75	0.38	4.24
Zambia	3.62	1.80	5.75	2.88	0.70	0.50	0.25	-0.14
Zimbabwe	1.15	1.15	5.41	2.64	0.35	0.25	0.13	5.67
Rest South African CU	4.31	2.75	3.23	2.77	0.70	0.50	0.25	3.54
Uganda	5.56	2.33	7.90	2.96	1.05	0.75	0.38	6.23
Rest of sub-Sah. Africa	3.61	2.42	3.61	3.15	0.70	0.50	0.25	3.15
China	6.98	0.70	3.90	1.01	1.75	1.25	0.63	8.67
USA	3.01	0.73	0.72	0.90	1.40	1.00	0.50	3.37
Latin Ame. + Caribbean	3.14	1.33	4.99	1.45	0.35	0.25	0.13	3.61
Rest of the World	2.57	1.24	2.61	1.70	0.70	0.50	0.25	2.71

Sources: World Bank forecast, dynamic GTAP Model data (Walmsley *et. al* 2000) and own assumptions. [*] The endowment of capital is determined endogenously – determined by the exogenous variables shown above and by the model and associated data

Enlargement scenarios

The enlargement scenarios considered in this paper entails the integration of the CEECs into the EU's CAP in the year 2013 in a world shaped by the baseline scenario. Enlargement of the EU implies that all tariffs and export subsidies as well as non-tariff barriers between the EU and the CEECs are abolished. At the same time all sectors in the CEECs are given the same level of protection against third countries as found in the EU at the time of accession.

In Table 2 and 4 the EU import tariff equivalents and export subsidy rates assumed in this analysis are shown as a per cent of world market prices in 2013 together with the equivalent border protection rates for CEECs before enlargement of the EU. Table 2 and 4 clearly shows that integrating the new member countries into the CAP leads to substantial changes in the CEECs agricultural border protection rates for many commodities.

Table 2. Import tariff equivalent, pre enlargement 2013, per cent

	EU*	Cyprus /Malta	Cz.Rep.	Estonia	Hungary	Latvia	Lithuania	Poland	Slovakia	Slovenia
Paddy rice	64.9	0.0	0.0	0.0	63.4	0.4	0.0	156.8	0.0	0.0
Wheat	48.8	0.2	17.7	0.0	26.0	24.6	7.6	44.5	17.7	47.7
Other grains	17.5	0.0	6.4	0.0	16.1	38.6	3.6	48.6	7.9	53.3
Veget., fruit, nuts	14.5	0.4	4.9	0.0	33.5	6.0	0.6	42.5	6.1	42.0
Oilseeds	0.0	0.0	6.0	0.0	1.0	0.5	0.0	15.5	8.9	0.0
Sugar cane and beet	251.4	0.0	13.2	0.0	29.8	0.5	0.0	0.0	13.2	45.0
Plant based fibbers	0.0	0.0	2.5	0.0	2.8	0.5	0.0	17.0	3.3	0.0
Other crops	3.1	3.0	2.5	0.0	17.3	1.8	0.3	18.5	2.1	2.2
Bovine animals	36.6	2.7	46.1	0.0	23.4	21.5	8.8	19.6	51.8	34.3
Other animals	6.7	0.2	3.8	0.2	15.4	11.6	2.8	32.7	4.2	30.6
Raw milk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wool	0.0	0.0	0.0	0.0	5.2	0.0	0.0	11.8	0.0	0.0
Natural Resource	0.9	0.6	0.0	0.0	0.6	0.3	0.0	0.4	0.0	0.9
Bovine meat products	71.9	0.1	29.1	0.0	37.0	23.2	13.4	82.1	40.4	68.8
Other meat products	30.9	2.7	22.7	0.0	39.7	31.2	24.9	73.9	22.8	57.9
Veget. oils and fats	11.4	0.4	5.4	0.0	16.2	6.2	7.5	34.9	4.7	38.8
Dairy products	79.6	0.7	20.7	0.0	52.0	20.1	16.8	110.7	25.8	73.6
Processed rice	87.4	0.0	0.0	0.0	51.5	0.4	0.0	9.3	0.0	0.0
Sugar	76.4	4.7	42.6	0.0	54.2	0.4	43.4	235.0	47.0	64.2
Other process. foods	28.8	4.9	8.7	0.0	33.5	7.0	8.4	55.4	9.0	41.6
Beverage/tobacco	8.3	0.9	32.1	0.0	62.7	0.8	23.4	102.6	25.5	47.9
Tex/wearing apparel	9.1	4.1	8.7	0.0	10.5	5.8	7.4	19.9	0.0	15.0
Manufactures	3.5	4.7	5.8	1.2	7.1	1.7	1.1	12.7	0.0	9.7
Services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0

Source. GTAP Versions 5 and own calculation
* The shown import tariffs equivalents for the EU apply to all countries/regions with the exception of EBA countries listed in box 1 and in the case of bovine and other meat products imported from the CEECs. For the EBA countries the EU import tariff equivalents are zero. Bovine meat products exported to the EU from the CEECs face an import tariff equivalent 17.5 per cent in all countries with the exception of Czech Republic, Hungary, Latvia and Slovenia where the import tariff equivalent is zero. In the case of other meat products all exports from the CEECs face an import tariff equivalent of 23 per cent.

For example in the case of other grains, the EU at the time of accession has an import tariff equivalent of 17.5 per cent and an export subsidy rate of 13.7 per cent. Enlarging the EU means that Latvia, Poland and Slovenia have to reduce their import tariff rates from 38.6, 48.6, and 53.3 respectively to 17.5 per cent while the remaining countries have to raise their tariffs towards imports from third countries with the exception of the EBA countries where all the CEECs

reduce their import tariff equivalents to zero. Similar adjustments are made for all commodities shown in Table 2.

As is the case of import tariff equivalents, export subsidy rates are also brought into line with EU-15 rates, cf. Table 3, with the exception of sugar. In the case of sugar the total A and B quotas allocated to the CEECs were calculated not to exceed internal consumption plus the quantity that can be exported within the limits of each countries WTO commitments. This means that the average EU-15 export subsidy rate of 26.1 per cent is not extended to the CEEC. Therefore, Hungary, Poland and Slovakia maintain their use of export subsidies within their national WTO commitments. The remaining seven candidate countries have no subsidised exports of sugar.

Generally, CEECs will introduce subsidised exports to third countries on exports of other grains, bovine meat and dairy products, with the exception of Czech Republic and Slovakia. In both these countries, the average export subsidy rates for bovine meat and dairy products exceed EU rates wherefore in the enlargement scenario modelled in this paper their export subsidy rates are reduced to match EU levels.

Table 3. Export subsidy rates, pre enlargement 2013, per cent

	EU	Czech Republic	Hungary	Poland	Slovakia
Paddy rice	13.8	0.0	0.8	0.0	0.0
Wheat	0.0	0.0	4.4	0.0	0.0
Other grains	13.7	0.0	0.8	0.0	0.0
Veget. fruit, nuts	0.8	0.0	2.3	0.0	0.0
Oilseeds	0.0	0.0	0.6	0.0	0.0
Sugar cane and beet	0.0	0.0	0.6	0.0	0.0
Other crops	0.4	0.0	0.8	0.0	0.0
Bovine animals	0.0	0.0	7.4	0.0	0.0
Other animals	0.0	0.0	0.8	0.0	0.0
Raw milk	0.0	0.0	3.4	0.0	0.0
Bov. meat products	10.1	65.4	0.5	0.0	45.2
Other meat products	0.0	0.0	1.8	0.0	0.0
Veget. oils and fats	0.1	0.0	4.4	0.0	0.0
Dairy products	16.4	28.0	0.0	0.0	26.7
Processed rice	13.8	0.0	0.8	0.0	0.0
Sugar	26.1	0.0	2.7	6.2	1.9
Other process. foods	1.9	0.4	0.0	0.0	0.6

Source. GTAP versions 5 and own calculation
For those commodities and countries not shown export subsidies are not used.

The enlargement scenario also extends the reformed (Agenda 2000) CAP to the new member countries including the common financing of the agricultural policy (import tariffs and common contributions to the European Common Budget) and transfers from the EU to pay for export subsidies, output subsidies and hectare and livestock premiums in the new member countries. The expansion of the CAP to the CEECs follows the outlines for domestic support (direct payments, production quotas and other supply management instruments) as laid down by the Copenhagen Agreement (see appendix A).

It is also important to stress, that the enlargement scenario is based on the assumption – in line with the present rules under the CAP – that the premium per hectare is reduced proportionally to the extent the total reform crop area exceeds the total defined base area. The total budgetary

outlay is fixed (pre-defined as the EU per hectare premium multiplied by the defined base area eligible for the payments), however, the assumption used implies that there are no effective restrictions (in economic terms) at the individual farm level limiting the incentive to increase the reform crop area. This implies that there is no limitations restricting the reallocation of land in the enlargement scenario analysed in this paper, affecting in particular, the estimated crop supply responses in the new member countries (land reallocation from non-eligible crops to eligible reform crops).

Introducing the CAP in the CEECs increase domestic support dramatically. In Table 4 below the aggregate power of domestic support for the present 15 members of the EU (EU-15) is shown together with the power of support found in the CEECs before accession. The power of support equals 1 plus the ratio of total value of the payment (the sum of the value of output subsidies, intermediate input subsidies, land-based payments and capital-based payments incorporated into the GTAP V5 database) over the value of production.

Table 4.   Power of domestic support pre enlargement 2013

	EU	Cyprus /Malta	Cz.Rep.	Estonia	Hungary	Latvia	Lithuania	Poland	Slovakia	Slovenia
Paddy rice	1.10	1.00	1.00	1.00	0.86	1.00	1.00	1.00	1.00	1.00
Wheat	1.63	0.91	1.05	1.32	1.03	1.05	1.06	1.02	1.18	1.09
Other grains	1.60	0.89	1.03	1.44	1.02	1.05	1.01	1.01	1.18	1.04
Veget. fruit, nuts	1.03	0.74	1.08	1.08	1.09	1.03	1.02	1.04	1.21	1.15
Oilseeds	1.30	0.80	1.03	1.00	1.03	1.00	1.00	1.04	1.19	1.00
Sugar cane and beet	1.05	1.00	1.05	1.00	1.03	1.05	1.01	1.02	1.17	1.14
Plant based fibbers	1.34	1.00	1.07	1.06	1.12	1.05	1.02	1.05	1.17	1.09
Other crops	1.04	0.93	1.08	1.07	1.08	1.03	1.02	1.04	1.23	1.16
Bovine animals	1.70	0.78	1.11	1.03	1.06	1.11	1.20	1.01	1.14	1.09
Other animals	1.04	0.77	1.06	1.03	1.05	1.07	1.02	1.02	1.13	1.01
Raw milk	1.16	0.89	1.08	1.06	1.05	1.01	1.09	1.01	1.24	1.07
Wool	1.00	0.91	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00

Source. GTAP Versions 5 and own calculation

In a number of cases the database reflects significant domestic support measures in primary agriculture in the EU. In the case of other grains and bovine animals, the domestic support measures amount to 60 and 70 percent respectively of the value of the domestic production in 2013. Compared to the EU aggregate power of support, the CEECs do not support domestic agricultural production to the same degree. Therefore integrating the CEECs into the EU will increase domestic support drastically in these countries, enhancing farmer's incentives to produce commodities receiving the largest support[3].

4. Results

Aggregated supply response
In Table 5 below the aggregate supply responses for the CEECs, EU-15 and the Rest Of the World (ROW) are shown for the baseline and enlargement scenario, using index numbers and percentage change in production due to the enlargement of the EU in 2013.[4][5]

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[3] The actual power of domestic support in the CEEC after enlargement will differ from the EU average shown in Table 4 due to different sizes of reference yields/area/quantities used to calculate domestic support values in each new member country.

[4] The model is solved using GEMPACK (Harrison and Pearson, 1996).

[5] In appendix B supply responses are shown for all 24 commodities in each of the 25 countries in the enlarged EU using index numbers where the base year 1997 is index 100.

Table 5. Change in production, 1997 = index 100.

	CEECs			EU-15			Rest of World		
	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%
Wheat	116	132	14.0	119	116	-1.9	120	120	-0.2
Other grains	118	135	14.5	104	102	-2.0	125	125	-0.3
Vegetables, fruit, nuts	134	103	-22.6	141	144	1.7	140	140	0.0
Oilseeds	141	142	1.3	120	119	-0.3	125	125	-0.1
Sugar cane and beet	121	118	-2.1	106	106	-0.5	131	131	-0.2
Plant based fibbers	330	199	-39.7	151	150	-1.0	137	137	-0.2
Other crops	132	102	-22.5	132	132	0.4	124	124	0.3
Bovine animals	136	144	6.0	105	104	-0.8	134	134	-0.1
Other animals	131	135	2.8	112	111	-0.8	166	165	0.0
Raw milk	131	85	-35.2	100	101	0.8	127	128	0.4
Wool	156	144	-7.5	261	261	-0.2	152	151	-0.5
Natural Resource	139	138	-0.8	139	139	0.0	132	131	0.0
Bovine meat products	215	236	9.6	115	114	-1.0	137	137	-0.2
Other meat products	155	161	4.3	124	123	-1.0	140	140	0.0
Vegetable oils and fats	146	128	-12.4	121	122	0.5	134	134	0.0
Dairy products	157	87	-44.8	113	115	1.0	133	134	0.8
Sugar	137	136	-0.8	110	110	-0.4	139	139	-0.2
Other processed foods	142	164	15.3	119	117	-1.2	134	134	-0.2
Beverages and tobacco	170	121	-28.9	147	150	2.0	158	158	0.1
Textiles/wearing apparel	113	192	70.0	135	134	-0.7	159	158	-0.8
Manufactures	156	157	0.5	135	135	0.1	151	151	0.0
Services	160	158	-1.2	135	135	0.0	154	154	0.0

The enlargement of the EU will increase production in the CEECs of crops receiving hectare premiums (wheat, other grains and oilseeds), while production of vegetables, fruits and nuts, plant-based fibbers and other crops is reduced. The production of bovine animals also increases in the CEECs due to the enlargement of the EU eventhough milk production declines (introduction of milk quotas).

In the EU-15 cereals production is reduced by roughly 2 per cent and bovine animal production by 0.8 per cent due to the enlargement, while production changes in the rest of the world are minimal.

In order to quantify and put some of the production changes shown in Table 5 into relief, FAOSTAT-Agricultural statistics (FAOSTAT (2003)) on crops and livestock production is used as an initial reference for the quantities of agricultural output in the base year 1997. Using the computed indexes, the level of agricultural output in the year 2013, pre and post enlargement of the EU, are calculated, focusing on cereals, meat and milk production.[6]

Cereals
Beginning with cereals Table 6 shows the global production responses for the world cereal market aggregated into the three regions, EU-15, CEECs and the Rest of the World for wheat and other grains.

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[6] The GTAP database is comprised of values wherefore the assumption is made that initial value of production found in the GTAP database reflects more or less the quantity of production reported by FAOSTAT in the base year 1997.

The global production of cereals is estimated on average to increase by 1.3 per cent per year during the period 1997 – 2013. The production of wheat and other grains will increase by 1.1 and 1.3 per cent, respectively. Enlarging the EU with the CEECs in 2013 barely affects global cereal production as a whole, but production is reallocated from the EU-15 and the ROW to the new member states as the overall level of protection and domestic support to the grain producers in the 10 Central and Eastern European Countries increases significantly. Cereal production in the new EU member states is estimated to increase by 9.3 million tonnes or by 14.3 per cent. Cereal production in the old member states decreases by 'only' 2 per cent or by 4.5 millon tonnes. This decrease is equally distributed between wheat and other grains.

For wheat, the grain producers in the CEECs increase their production by 3.4 million tonnes when becoming a member of the EU, reducing production in the EU-15 and the rest of the world by 2.2 and 1.4 million tonnes, respectively, with the EU-15 making the largest percentage reduction. In the case of other grains, the expansion of CEECs' production by 6.0 million tonnes reduces production in the ROW by 2.6 million tonnes and the EU-15's by 2.3 million tonnes. This actually implies that the global production of other grains increase by 1.0 million tonnes.

Table 6. Global Cereal Production

	1997 production	Growth rate 1997-2013	2013 production	Enlargement 2013		
				Production	Change	Change
	1000 t	*% Per year*	*1000 t*	*1000 t*	*1000 t*	*%*
Total cereals						
EU-15	208049	0.7	231070	226542	-4527	-2.0
CEECs	55508	1.0	65094	74431	9338	14.3
EU-25	263557	0.7	296163	300974	4810	1.6
ROW	1830503	1.3	2267839	2263619	-4220	-0.2
World	2094060	1.3	2564002	2564593	591	0.0
Wheat						
EU-15	94792	1.1	112497	110319	-2178	-1.9
CEECs	20770	0.9	24094	27465	3371	14.0
EU-25	115562	1.1	136591	137784	1192	0.9
ROW	497640	1.1	597247	595886	-1361	-0.2
World	613202	1.1	733838	733670	-168	0.0
Other grains						
EU-15	110541	0.2	114898	112607	-2291	-2.0
CEECs	34730	1.0	40990	46955	5964	14.5
EU-25	145271	0.4	155888	159561	3673	2.4
ROW	758596	1.4	950169	947511	-2658	-0.3
World	903867	1.3	1106057	1107072	1015	0.1

Note: Total cereals include the production of rice.

This reallocation of cereals production from the EU-15 and the ROW to the Central and Eastern European Countries is a result of the CEECs gaining duty free access to the EU-25 common market and the introduction of area payments to cereal. In the case of other grains CEECs exports to non-EU member regions are enhanced through the use of export subsidises being granted also to the exporters in the new member states.

In Figure 1, trade flows between the EU-15, CEECs and the ROW are shown as changes in 1000 tonnes wheat and other grain[7]. In parentheses are the corresponding percentage changes shown.

Please note, that in a few cases, the percentages reported mirrors the very small initial traded quantities and thus the very large percentage changes.

Figure 1. Change in exports, change in 1000 ton (per cent)

	Baseline 1997-2013	Enlargement 2013

WHEAT

OTHER GRAINS
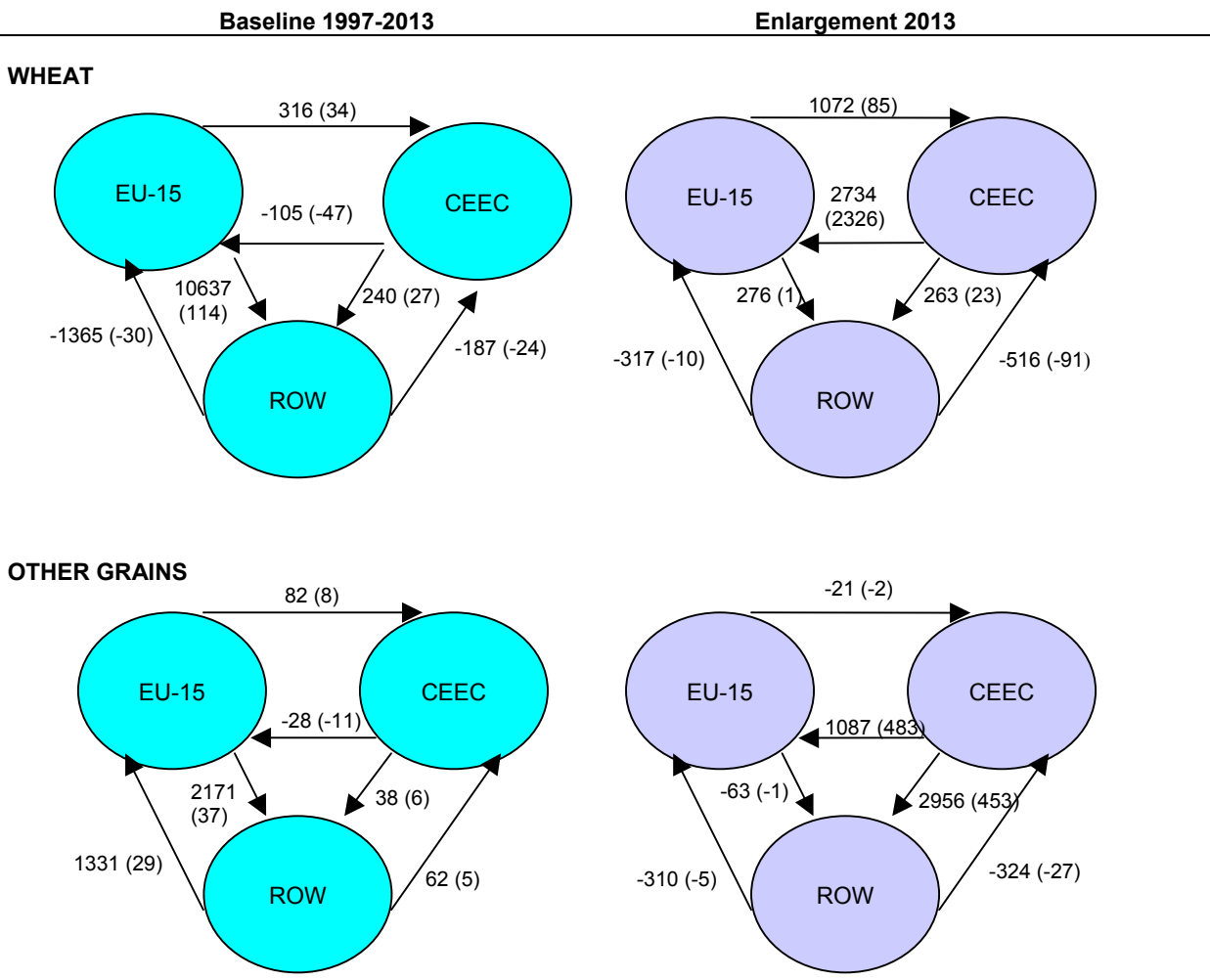
During the baseline period the net trade with wheat (total changes in exports minus total changes in imports), in the CEECs remains stable, although the EU-15 does increases its exports to the CEECs during this period, which reduce imports from the ROW. Enlarging the EU's common agricultural policies domain, increase the CEECs net trade by 2.4 million tonnes of wheat of which the 1.7 million tonnes is increased net exports to the EU-15. In the case of other grains only limited adjustments takes place during the baseline period. Imports/exports to and from the

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[7] These changes have been calculated using the GTAP databases initial values of exports at world market prices in the base year 1997, transformed into tonnes of wheat/other grains using a global average price of 116, 107 €/ton for respectively wheat and other grains, together with the estimated percentage change in quantities of exports The average price for wheat/other grains is simply calculated by taking the global value of wheat/other grains exports found in the GTAP database and dividing it by the total quantity of wheat/other grains exported in 1997 as reported by FAOSTAT.

CEECs remain stable, but enlarging the EU increases net trade of other grain from the CEECs by 4.4 million tonnes. The majority of this change in net exports is with the ROW, which increases by 3.3 million tonnes.

The net trade effects for the ROW's trade with the EU-25, due to the enlargement of the EU, reduces net exports of wheat and other grains by roughly 1.4 ((-317-516) – (276+263)) and 3.5 ((-310-324) – (-63+2956)) million tonnes, respectively.

The distribution of wheat and other grains production within the EU-25 is shown in Table 7. The production of wheat in the EU-15 amounts to 94.8 million tonnes in 1997, which increases to 112.2 million tonnes in 2013. It is reduced to 110.0 million tonnes after the enlargement of the EU. This decline corresponds to a reduction of 1.9 percent. The largest percentage reductions in production are found in the Netherlands and Italy, which reduce their production by 4.2 and 3.6 per cent respectively.

Table 7. Production of wheat and other grains, 1000 tonnes

	Wheat				Other grain			
	1997	2013	Enlargement		1997	2013	Enlargement	
	Production		Prod.	Change	Production		Prod.	Change
Belgium/Lux.	1718	1959	1920	-40	676	723	720	-3
Denmark	4965	6094	6007	-87	4565	5373	5286	-87
Germany	19827	23426	22814	-612	25659	26717	25892	-825
Greece	1991	2033	1963	-70	2500	2292	2280	-12
Spain	4676	5127	4970	-157	13872	13871	13709	-162
France	33847	42439	41599	-840	29464	29161	28556	-605
Ireland	725	666	651	-15	1219	1043	1027	-16
Italy	6758	6452	6218	-234	11697	9398	9329	-69
Netherlands	1063	978	936	-41	387	440	428	-12
Austria	1352	1757	1878	121	3656	5136	4834	-302
Portugal	329	577	561	-17	1066	1163	1160	-3
Finland	464	552	542	-11	3343	3602	3528	-75
Sweden	2056	2879	2892	14	3930	6796	6711	-86
United Kingdom	15020	17558	17368	-190	8507	9181	9149	-33
EU-15	**94792**	**112497**	**110319**	**-2178**	**110541**	**114898**	**112607**	**-2291**
Cyprus/Malta	21	43	79	36	38	114	255	141
Czech Rep.	3640	4325	4386	61	3355	4097	4368	271
Estonia	111	136	149	12	539	760	814	54
Hungary	5259	5075	7449	2373	8873	9225	11151	1926
Latvia	395	544	589	46	641	716	763	47
Lithuania	1127	1777	2302	526	1818	2055	3112	1056
Poland	8193	9677	9675	-2	17207	21055	23420	2365
Slovakia	1886	2313	2650	337	1854	2381	2580	199
Slovenia	139	204	186	-18	405	588	492	-97
CEECs	**20770**	**24094**	**27465**	**3371**	**34730**	**40990**	**46955**	**5964**
EU-25	115562	136591	137784	1192	145271	155888	159561	3673

In the CEECs, Hungary alone accounts for 70 per cent (2.4 million tonnes) of the increased wheat production in the enlargement scenario, while Poland's production hardly changes.

This unchanged production response in Poland is the net effect of changing border projection rates and introducing higher levels of domestic support. On the one hand Poland's production of wheat is negatively effected by abolishing all trade barriers between the new EU-25 common market members and by adopting the EU-15 level of projection against third countries. Poland is a net importer of wheat with initially high level of protection (see Table 2) before accession to

the EU. On the other hand, increasing domestic support in the form of hectare premiums to land stimulates production of the so-called reform crops (including wheat). In sum, the net affect of EU membership does not change significantly the economic incentive of the wheat producers in Poland.

In Hungary, on the contrary, being a net exporter of wheat, the abolishing of all trade barriers between the new EU-25 common market members increase in the production and introducing hectare premiums further stimulates the production of wheat. The overall net effect is that Hungary increases its production of wheat by a total 47 per cent, with Italy and Spain becoming major exports market for Hungary.

In the case of other grains, joining the EU increases production by 14.5 per cent (6.0 million tonnes) in the CEECs, with Poland, Hungary and Lithuania accounting for 90 per cent of this increase. The majority of Poland and Lithuania's trade is increased exports out of the new common market (EU-25), while the main part of Hungary's increased trade is intra exports to the new EU-25 common market. In the EU-15 the production of other grains decreases on average by 2.0 per cent, the largest reductions being in Austria and Germany, which decline by 5.9 and 3.1 per cent, respectively.

Meat
In Table 8 the global meat production in carcass weight equivalent (cwe) is shown in 1997 and the estimated production levels in 2013, pre and post enlargement. The initial amounts of meat production in 1997 include both commercial and farm slaughtered animals and meat equivalent of exported live animals, as defined by FAOSTAT. The estimated production of meat in 2013 is calculated by using the model simulation percentage change in primary production of bovine animals (mainly bovine cattle, sheep, goats and horses) and other animal products (mainly pigs, poultry and other animals) together with the initial quantities of meat production in cwe as found in FAOSTAT.

Table 8. Global meat production, cwe

	1997 Production	Growth rate 1997-2013	2013 Production	Enlargement 2013		
				Production	Change	Change
	1000 t	*% per year*	*1000 t*	*1000 t*	*1000 t*	*%*
Total meat						
EU-15	34839	0.6	38477	38153	-324	-0.8
CEECs	5745	1.8	7590	7843	253	3.3
EU-25	40584	0.8	46067	45996	-71	-0.2
ROW	174267	2.8	269596	269424	-172	-0.1
World	214851	2.4	315663	315420	-243	-0.1
Bovine meat						
EU-15	9111	0.3	9557	9477	-80	-0.8
CEECs	928	1.9	1263	1339	76	6.0
EU-25	10040	0.5	10820	10816	-4	0.0
ROW	59852	1.8	80211	80113	-98	-0.1
World	69891	1.7	91031	90929	-102	-0.1
Other meat						
EU-15	25728	0.7	28919	28675	-244	-0.8
CEECs	4816	1.7	6327	6504	177	2.8
EU-25	30544	0.9	35247	35180	-67	-0.2
ROW	114416	3.2	189385	189311	-74	0.0
World	144960	2.8	224632	224491	-141	-0.1

The global production of meat is expected to increase by 2.4 per cent annually from 1997 to 2013. The production of other meat increases by 2.8 per cent and bovine meat by 1.7 per cent annually. Enlarging the EU once again only marginally effects production in the Rest of the World. The production of meat in the EU-15 declines by 0.8 per cent, mainly as a result of increased competition from the new member countries, where the production of bovine and other meat production increase by 6,0 and 2.8 per cent, respectively.

In Figure 2, changes in exports of commercially slaughtered and processed meat products are shown as percentage changes in quantities of exports together with relative changes in the quantity of exports measured as changes in million of € where initial 1997 prices are held constant. [8]

Figure 2. Change in exports, million of € in fixed 1997 prices (per cent)

Baseline 1997-2013	Enlargement 2013

BOVINE MEAT PRODUCTS

OTHER MEAT PRODUCTS

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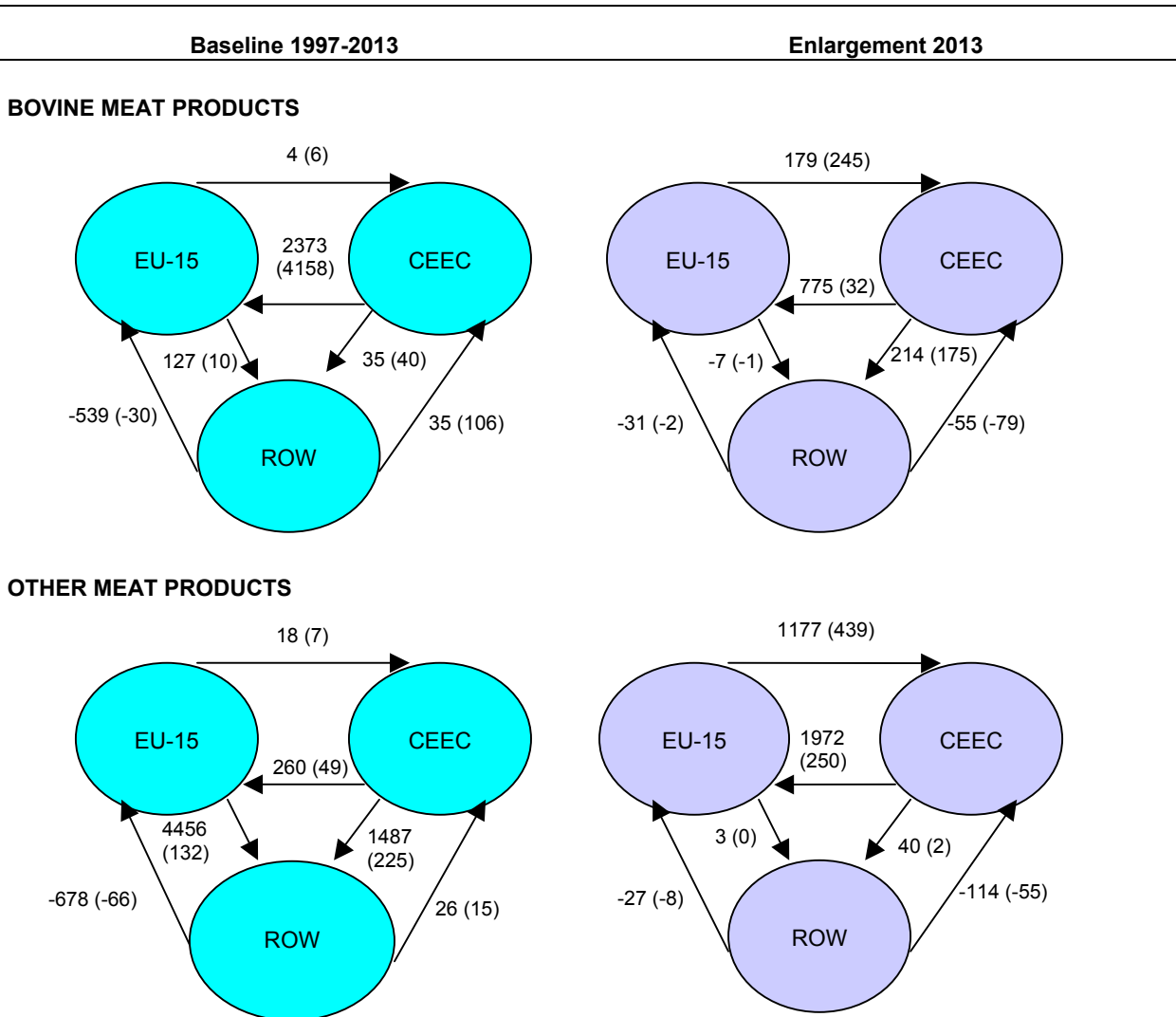
[8] Changes in values of exports, using fixed prices are highlighted here instead of changes in 1000 tonnes meat because the initial values of exports found in the GTAP database for bovine meat products and other meat products are processed values where value added has been incorporated by the processing industries making it difficult to define a global average price to convert these value flows into quantities. Secondly bovine meat and other meat products also span over a large variety of products, making it even more complicated.

During the baseline period the CEECs increase their exports of bovine meat products to the EU-15 significantly due to the modelled association agreements according to which the CEECs is given preferential market access to the domestic marked of the European Union. This large surge in exports of bovine meat products displaces imports from regions outside Europe by 30 per cent. Enlarging the EU increases trade between the EU-15 and the CEECs resulting in a net trade lose for the ROW amounting to 293 million € in fixed 1997 prices.

In the case of other meat products the EU-15 and the CEECs increase their exports to the ROW by respectively 4.5 and 1.5 billion € (at fixed 1997 prices) during the baseline period. Once again exports from the ROW to the EU-15 are reduced by 678 million € due to the modelled association agreement. Enlarging the EU increases trade between the EU-15 and the CEECs resulting in a net trade lose for the ROW of 184 million €.

In Table 9 the distribution of bovine animals and other animal production in cwe, using FAOSTAT's initial quantities of production, are shown for the EU-25 countries. During the baseline period of 16 years the bovine meat production increases by 4.9 per cent in the EU-15, with the largest percentage increases in production taking place in Ireland.

In the CEECs production increase by 36.0 per cent during the baseline period with Hungary having the largest percentage increase in production more than doubling their production. Hungary increases its exports mainly to Italy, Germany and Austria, where notably Italy and Austria face a declining production of bovine meat during the baseline period.

Table 9. Production of bovine and other meat products, 1000 tonnes cwe

| | Bovine meat | | | | Other meat | | | |
| | 1997 | 2013 | Enlargement | | 1997 | 2013 | Enlargement | |
	Production		Prod.	Change	Production		Prod.	Change
Belgium/Lux.	348	369	367	-1	1395	1699	1663	-37
Denmark	177	188	187	-1	1700	1898	1926	29
Germany	1496	1409	1400	-9	4413	4608	4535	-73
Greece	218	229	231	2	301	322	321	0
Spain	846	1009	1004	-5	3435	4370	4321	-48
France	1881	2057	2046	-11	4756	5453	5402	-52
Ireland	648	849	844	-5	329	362	358	-4
Italy	1290	1182	1158	-24	2770	2854	2840	-13
Netherlands	581	665	649	-15	2107	2578	2538	-40
Austria	214	185	186	1	665	654	654	0
Portugal	137	157	157	0	576	688	687	-1
Finland	101	102	100	-1	234	296	296	0
Sweden	154	145	137	-8	438	439	440	1
United Kingdom	1019	1013	1010	-3	2610	2698	2693	-5
EU-15	**9111**	**9557**	**9477**	**-80**	**25728**	**28919**	**28675**	**-244**
Cyprus/Malta	15	22	30	8	97	130	139	9
Czech Rep.	160	228	178	-50	671	790	775	-15
Estonia	19	24	25	1	34	40	42	1
Hungary	57	121	115	-6	1005	1279	1314	35
Latvia	26	30	33	2	45	53	51	-2
Lithuania	91	109	119	10	116	133	132	0
Poland	437	562	677	115	2383	3314	3484	170
Slovakia	68	89	84	-5	333	412	396	-16
Slovenia	55	78	78	0	132	176	171	-5
CEECs	**928**	**1263**	**1339**	**76**	**4816**	**6327**	**6504**	**177**
EU-25	10040	10820	10816	-4	30544	35247	35180	-67

The majority of increased bovine meat exports from the CEECs during the baseline period, as illustrated in Figure 2, are exports to the Italian and German markets, accounting for respectively 41 and 20 per cent of the increased exports to the EU-15 with Hungary, Poland, Czech Republic and Slovenia being the largest suppliers.

Enlarging the EU with the CEECs increase notably Poland's production of bovine meat products by 20.4 per cent while at the same time Czech Republic and Hungarian production declines. This is caused by the modelled European association agreement where the Czech Republic and Hungary are assumed to get duty free access to the EU market during the baseline period, whereas Poland also gains improved market access during this period, but still faces an import tariff equivalent of 17.5 per cent at the time of accession. Therefore on accession, the Polish exports of bovine meat products gain duty free access to the EU-15 markets, reducing mainly Czech Republic's exports to the EU-15.

Table 9 also puts the production of bovine meat into perspective in that the EU-15 countries account for 90.8 per cent of the bovine meat production in the EU-25 in 1997, declining to 88.0 per cent in the enlarged EU. France still remains the largest single producer accounting for 18.9 per cent of production compared to Poland's 6.3 per cent, the largest producer among the new member countries.

Looking at other meat products, the EU-15 production increases by 12.4 per cent during the baseline period compared to 31.4 per cent in the CEECs. In 1997 the EU-15 accounts for 84.0 per cent of the EU-25 production, which is reduced to 82.0 per cent in 2013. In the EU-15 it is Spain, which has the largest percentage increase in production of other meat products with an increase of 27.2 per cent. Spain increases its export by 156 per cent during the baseline, mainly increasing its exports to the EU-15 countries and to the ROW.

In the CEECs, Poland has the largest increase in production of other meat products during the baseline period, with an increase of 39.1 per cent. Poland's exports increase during this period by 299 per cent, which is predominately exports to regions outside Europe (e.g. Russia). As it can be seen in Table 9, Poland is the largest producer of other animal products among the CEECs. account for roughly 50 per cent of all production in the CEECs.

Enlarging the EU with the CEECs reduces the EU-15 share of total EU-25 production of other meat products from 82.0 per cent to 81.5. All EU-15 member countries reduce their production of other meat products with the exception of Denmark, which increases it production by 1.5 per cent. In the CEECs, Poland has the largest production response on becoming a member of the EU, increasing its production by 5.1 per cent.

As shown in Figure 2, trade between the EU-15 and the CEECs increases dramatically as exports from the old member countries to the new members increase by almost 1.2 billion € in fixed 1997 prices. The CEEC's export to the EU-15 increase by almost 2 billion € of which Germany imports accounts for approximately 57 per cent of this increase. Poland and Hungary are the main exporters to the EU-15 market with Poland by fare the most dominant country standing alone for 68 per cent of the increased exports to the EU-15 (predominantly going to the German market).

In the EU-15 intra trade between the old member countries is reduced by 9 per cent (1232 million € in fixed 1997 prices) due to the enlargement of the EU. The largest reduction in intra trade is of course with Germany, which accounts for over half of this trade reduction.

In the CEECs the EU-15 mainly increases its exports to Poland as a result of in particular the relatively large decline in import protection (compared to other accession countries, see Table 2).

Denmark's increased production of pork and poultry meat products in the enlargement scenario is caused by a relative large increase in exports to the new member countries, especially Poland, compared to the lose of internal trade with the old EU-15 countries, in particularly Germany.

Milk
The global production of raw milk is shown in Table 10. In 1997 the world production of milk amounted to 557 million tonnes, of which the EU-25 accounted for roughly one fourth of production.

During the baseline period milk production in the EU-15 remains stable at around 126 million tonnes due to the EU milk quota regime, while the production increases by an average of 1.7 per cent a year in the Central and Eastern European Countries. The CEECs' production of milk is not confined by the CAP quota system before 2013 - the year from which the economic consequences of the enlargement of the EU are evaluated in this paper.[9] The applied method for evaluating the long-term implications of the European Enlargement allows us to evaluate by how much the allocated milk quotas to the new member countries will be restricting the future milk production in the new member states.

Table 10. Global raw milk production, 1000 tonnes

	1997 Base production	Growth rate 1997-2013	2013 Production	Enlargement 2013		
				Production	Change	Change
	1000 t	*% per year*	*1000 t*	*1000 t*	*1000 t*	*%*
Total milk						
EU-15	125596	0.0	125811	126818	1006	0.8
CEECs	22553	1.7	29492	19118	-10375	-35.2
EU-25	148149	0.3	155304	145935	-9368	-6.0
ROW	409198	1.5	521040	522911	1871	0.4
World	557346	1.2	676344	668847	-7497	-1.1

According to the analysis the countries in Central and Eastern Europe will in 2013 be producing around 35 per cent less raw milk as compared to a situation in which they did not join the European Union. Clearly, the allocated milk quotas according to the accession agreement do limit the expansion of the milk production in the 10 new member countries with significant differences across the new members. The restrictiveness of the allocated quotas leads to a slight increase in the milk production in EU-15 and the regions outside Europe.

This increased production of milk in the EU-15 and the ROW is reflected in Figure 3 where the CEECs reduce their (limited) dairy exports to the ROW by 92 per cent and increase their imports from the EU-15 notably when becoming a member of the EU. For the ROW these changes in trade flows due to the enlargement of the EU, results in a net trade gain of 1.3 billion € in fixed 1997 prices.

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[9] According to the Copenhagen agreement, milk quotas in the CEEC will be implemented in 2004. Therefore the estimated growth in milk production in the CEEC during the baseline period represents a possible expansion of production if the CEEC did not become a member of the EU before 2013 – i.e. the level from which we chose to evaluate the restrictiveness of the allocated quotas to the new members.

Figure 3. Change in exports, million of € (per cent)

| Baseline 1997-2013 | Enlargement 2013 |

DAIRY PRODUCTS
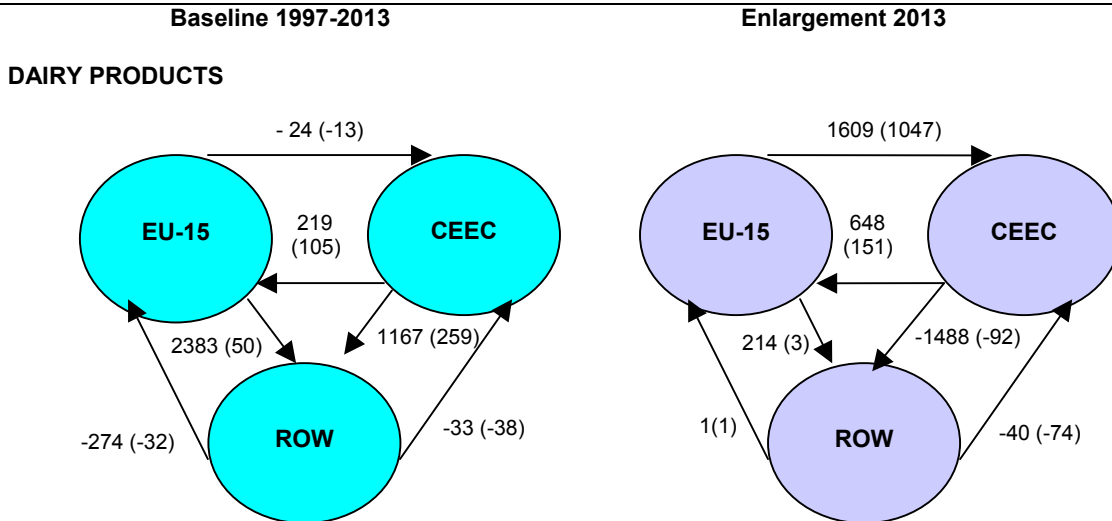
In Table 11 the production of raw milk within the EU-25 is shown for the base year 1997 together with the production in 2013, pre and post enlargement.

Table 11. Production of milk, 1000 tonnes

	Cow Milk	Goat & Sheep	Camel & Buffalo	Total milk production			
				1997	2013	Enlargement	Change
Belgium/Lux.	3477	0	0	3477	3529	3529	0
Denmark	4632	0	0	4632	4701	4701	0
Germany	28702	22	0	28724	27843	28731	888
Greece	737	1245	0	1982	2202	2202	0
Spain	5837	708	0	6545	7048	7054	7
France	24917	732	0	25649	26033	26033	0
Ireland	5256	0	0	5256	5407	5407	0
Italy	11752	922	144	12818	12055	12095	40
Netherlands	10922	0	0	10922	11086	11086	0
Austria	3090	22	0	3112	3159	3159	0
Portugal	1760	139	0	1899	1927	1927	0
Finland	2463	0	0	2463	2500	2500	0
Sweden	3276	0	0	3276	3237	3308	72
United Kingdom	14841	0	0	14841	15084	15084	0
EU-15	**121662**	**3790**	**144**	**125596**	**125811**	**126818**	**1006**
Cyprus/Malta	180	49	0	229	465	244	-221
Czech Rep.	2787	18	0	2805	3151	2754	-397
Estonia	717	0	0	717	1144	646	-498
Hungary	1989	30	0	2019	2927	2020	-907
Latvia	986	2	0	988	1006	730	-277
Lithuania	1950	0	0	1950	2954	1705	-1250
Poland	12123	1	0	12125	15667	9385	-6283
Slovakia	1116	18	0	1134	1488	1058	-430
Slovenia	587	0	0	587	690	577	-113
CEECs	**22436**	**117**	**0**	**22553**	**29492**	**19118**	**-10375**
EU-25	144098	3907	144	148149	155304	145935	-9368

The production of raw milk in EU-15 amounted to 126 million tonnes in 1997 where roughly 4 million tonnes originates from goat and sheep milk. During the baseline period the Agenda 2000 reform of the CAP is implemented, increasing milk quotas in the EU-15 by an average of 2.4 per

cent. Nevertheless, milk production declines on average by 0.2 per cent in the period considered as the initial quota rents for Germany, Spain, Italy and Sweden are estimated to be eroded, wherefore the milk quota is not any longer binding in these countries in 2013[10].

As a result the milk production in Germany, Italy, and Sweden decline by 3.1, 6.0 and 1.2 per cent respectively, whereas Spain increases its production by 7.7 per cent – an increase which still is less that the Agenda 2000 expansion of the Spanish milk quota (9.9 per cent). In all other EU-15 member countries, milk production expands, in line with the Agenda 2000 reform as the milk quota is still binding in these countries.

In the CEECs production increases from 23 million tonnes to 29 million tonnes during the baseline period with Poland being the major producer accounting for over half of total production in the CEECs. During the baseline period Poland increase its exports of dairy products significantly, mainly to countries in the rest of the world aggregate.

Introducing quotas in the CEECs (in 2013) reduces milk production by 10.4 million tonnes, with Poland making the largest reduction from 15.6 to 9.4 million tonnes. In the enlargement scenario Poland reduces its dairy exports to the ROW by 95 per cent and at the same time increase its imports of dairy products mainly from Germany.

In the enlargement scenario Germany, Sweden, Finland, Italy and Spain increase their production of raw milk, with Germany making the largest increase in production. Even though milk production increases in these five countries, production still lies below the milk quota.

The EU budget and inter-regional transfers
Two questions, often being raised in connection with the discussion of EU enlargement, is how much is it going to cost and who is going to pay for the enlargement.

Table 12 illustrates the budgetary costs pre and post the enlargement scenario undertaken in this paper. The budget for 1997 is for the EAGGF financial year 1997/1998. The cost of the CAP in that year was € 43 billion. Given the assumptions applied in the analysis this cost increases to € 51 billion in 2013 (current prices) before the enlargement – a nominal increase of 17 per cent in total. This increase falls within the guidelines provided in the EU 'Financial framework' for the period 2000-2013[11].

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[10] In appendix C, the method used to estimation and model milk quotas rents in this paper are shown.

[11] The budgetary guidelines laid down by the European Council in Berlin stated that the category 1a CAP expenditure (market measures and compensatory direct aid) was to be limited at to a ceiling of 40.5 billion € in 1999 which was allowed to increase by 2 per cent per year in nominal terms for the period 2000 - 2006 (Agra Europe 1999). At the European Council meting in Brussels in October 2002 the budgetary guidelines laid down by the European Council in Berlin were extended so that the overall CAP expenditure would be allowed to increase by 1 per cent per year in the period 2007 – 2013. Therefore, in 2013, the maximum CAP expenditure is limited to 49.9 billion € (current prices), which does not include rural development expenditures. Rural development expenditures in 2002 amounted to 4.6 billion € in the EU-15 and the European Commission allocated in 2006, 1.8 billion € (1999 prices) in rural development for the CEEC. Inflating these rural development payments using 2 per cent inflation until 2007 and 1 per cent in the period 2007 – 2013 and adding them to the 2013 CAP expenditure, a total agricultural expenditure of around 57.5 billion € in 2013 prices is assumed to be the EU financial framework ceiling in 2013. However, the funding cap from 2006 onwards does not cover expenditure on rural development policies, offering the possibility of an expansion in this area of CAP spending (Agra Europe 2002).

Table 12 Financial impact of extending the CAP to the CEECs, mio. €, current prices

	1997	2013	Enlargement
Total agricultural expenditure*	43165	50549	58983
of which EU-15			
Hectare premiums	16147	16741	16692
Animal premiums	5787	8868	8868
Milk premiums	0	2958	2958
Other support measure	16399	18189	18138
Export refunds	4833	3794	3698
Total EU-15	43165	50549	50353
of which CEECs			
Hectare premiums	0	0	4051
Animal premiums	0	0	1166
Milk premiums	0	0	475
Other support measure	0	0	2655
Export refunds	0	0	283
Total CEECs	0	0	8630
Agricultural levies	-1102	-754	-656
Net cost of CAP	-42063	-49796	-58327
-% of GDP	0.5994	0.4143	0.4653

*Note: Initial total agricultural expenditure in the base year 1997 of the GTAP database originates from OECD's PSE
  Tables edition 2001 where:
  Total agricultural expenditure = total PSE expenditure in 1998 – Market price support + export refunds

To balance the EU agricultural budget the common rate of member state contributions is reduced from 0.599 per cent of GDP in 1997 to 0.414 per cent in 2013. Note that given the estimated costs of the CAP, the contribution rate is endogenously determined.

The cost of the extending the CAP to the CEECs in the enlargement scenario is 8.6 billion €, increasing the budgetary cost of financing the CAP by roughly 17 per cent. This exceeds the assumed budgetary guideline of 57.5 billion € by roughly 1.5 billion € in current 2013 prices.

Taking into account the simple modelling of the CAP budget undertaken in this paper, the analysis shows that it should be possible to enlarge the EU with the CEECs without overshooting the financial perspectives for the EU-25 to any great extent. The common rate of member state contributions increases by 0.051 per cent to 0.4653 per cent, well below its 1997 level.

Leaving the aggregate EU budget, Figure 4 illustrates the net contributions of the individual member countries to the Common Agricultural Budget in 2013 before and after the enlargement. Net contributions are defined as the contribution from GDP (a per cent of their GDP) less support received (other subsidies, hectare and livestock premiums etc.), plus import tariff revenue collected. Figure 5 illustrates the net impacts of the enlargement on each of the member states net contributions.

In 2013 Belgium/Luxembourg Germany, Italy, the Netherlands, Austria, Sweden and the United Kingdom will be net contributors to the CAP budget whereas Denmark, Finland, Greece, Spain, France, Ireland and Portugal were net receivers of financial support from the CAP budget (just as in the base year).

Enlarging the European Union leads to higher net contributions for all the old member states whereas the new member countries – not surprisingly are net receivers of transfers from the CAP budget. The total net cost (expenditures of 8.6 billion € less contributions) of enlarging the EU is

6.2 billion € with Poland being the largest net recipient of CAP transfers followed by Hungary and Czech Republic. Of the net 6.2 billion € the CEECs receives, Germany is paying roughly 24 per cent of this net transfer followed by France, the United Kingdom, Italy and Spain contributing with 17, 16, 14 and 7 percent, respectively. These five countries are paying roughly 79 per cent of the net cost of the EU enlargement. The remaining 21 per cent is financed by the remaining 10 smaller countries in the old EU with Portugal, Greece, Ireland and Finland with the smallest contributions.

Figure 4. Net contributions to CAP budget, pre and post accession, mio. current €, 2013

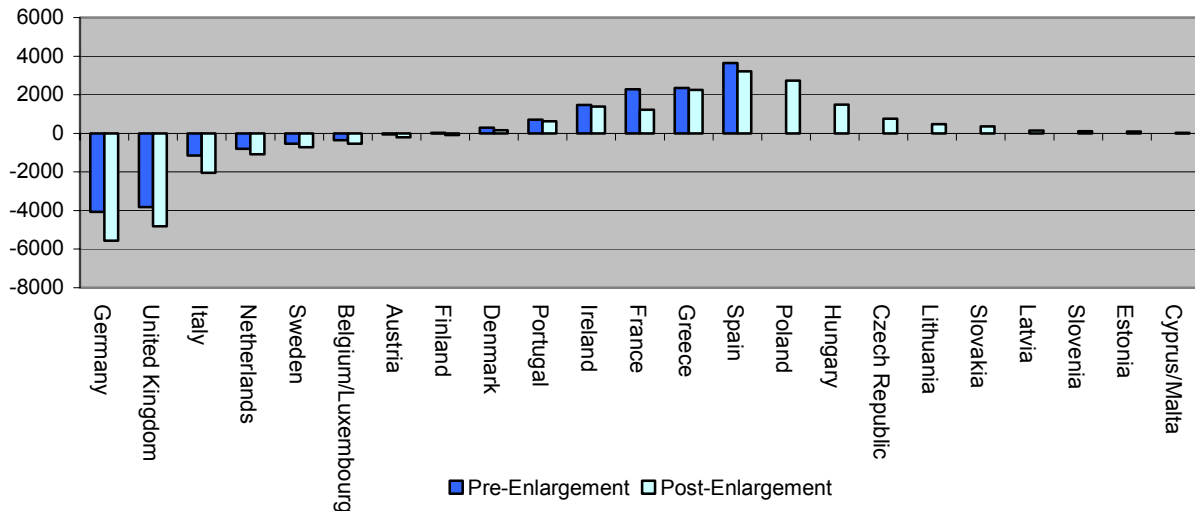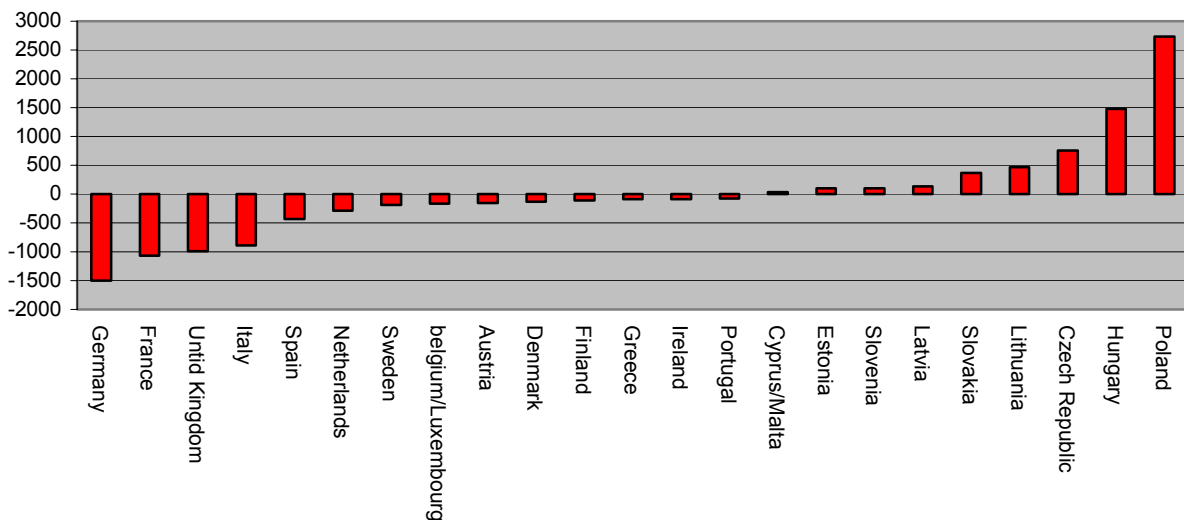**Figure 5. Change in net contributions to CAP budget, mio. current €, 2013**

Welfare implications
More important than such budgetary implications are the overall welfare implications – although the political debate very often focuses exclusively on the effects on the 'visible budget'. The welfare effects, quantified by using the money metric value of the Equivalent Variation, are shown in Table 14.

Table 14. Enlargement, change in economic welfare, current prices-million €

	GDP per cent change	Total welfare change	Transfers between EU members	Allocative efficiency change	Terms of Trade	Others
Belgium/Luxemborg	0.014	-558	-172	51	-430	-8
Denmark	0.016	-77	-131	39	20	-5
Germany	0.026	-530	-1497	746	221	0
Greece	0.008	-121	-91	15	-25	-19
Spain	0.009	-270	-435	73	85	7
France	0.000	-1111	-1068	-10	-45	11
Ireland	0.005	-137	-87	8	-64	6
Italy	0.015	-635	-894	250	9	1
Netherlands	0.056	-79	-284	328	-132	9
Austria	0.093	83	-155	284	-48	2
Portugal	0.009	-161	-79	14	-67	-30
Finland	0.002	-86	-112	5	26	-6
Sweden	0.015	-114	-187	53	22	-2
United Kingdom	0.004	-1019	-994	69	-86	-8
EU-15	**0.016**	**-4815**	**-6186**	**1925**	**-514**	**-42**
Cyrus/Malta	0.012	204	32	2	152	18
Czech Republic	0.568	2005	749	501	629	125
Estonia	-1.148	214	100	-77	167	23
Hungary	-0.093	2328	1446	-60	878	63
Latvia	-0.737	203	137	-57	93	30
Lithuania	-0.545	836	453	-69	340	112
Poland	1.845	6198	2742	4271	-268	-547
Slovakia	-0.121	838	359	-31	424	86
Slovenia	1.407	573	102	445	36	-10
CEECs	**0.967**	**13398**	**6120**	**4925**	**2451**	**-100**
Rest of World	0.004	-3337	0	-1438	-1987	87
Total	**0.012**	**5246**	**-66**	**5412**	**-50**	**-55**

Note: Economic welfare is measured as the money metric value of the Equivalent Variation. Others include a capital market related terms of trade effect and impacts of technical changes (e.g. set-aside requirement in CEECs).

In total, the CEECs are estimated to gain a welfare improvement of approximately 13.3 billion € in current 2013 prices, where a large part of these economic welfare gains originate from the CAP transfers.

Note, however, that the welfare effects reported in this paper are explained entirely by the impacts of extending the CAP to the CEECs, as the objective of this study has been to study these aspects. Therefore, the welfare effects reported do not include the effects of an extension of the structural funds support or the possible important effects of dynamic efficiency gains from trade liberalisations or the potential role foreign direct investments might have (i.e. enhanced capital accumulation and higher productivity growth).

Highlighting Poland, the total increase in welfare amounts to 6.2 billion €, which is equivalent to an increase of 2.9 per cent in per capita utility. This increase in per capita utility stems from not only CAP transfers (2.7 billion €), but also from a better utilisation of Polish production resources (efficiency gains) in that Poland has to reduce its import protection for a wide rang of commodities resulting in a more efficient production structure as a whole for Poland. The non-agricultural efficiency gains out-weight the negative effects of increasing agricultural production through increased domestic support.

The net result of increased efficiency in Polish economy is a larger quantity of goods being produced, which increase GDP by 1.8 per cent while at the same time there is a small negative terms of trade effect.

In the case of Latvia, becoming a member of the EU actually results in a reduction in allocative efficiency, reducing GDP by 0.7 per cent, but increased terms of trade together with CAP transfers result in an increase in total welfare of 203 million €.

For almost all the old EU members the accession of the CEECs curtails a slight lose of economic welfare, the largest in money metric terms being in France with 1,111 million €.

For almost all the old EU members the accession of the CEECs lead to increased efficiency gains due to reduced production of some highly protected agricultural commodities, which reduce the total welfare loss of extending CAP transfers to the CEECs. In Austria the efficiency gains are actually larger than the net lose of welfare due CAP transfers to the CEECs.

In general the overall welfare loss/gains for the old EU members is estimated to be very small and the welfare loses in non-member regions is also found to be minimal.

5. Summing up and a few perspectives

This paper is a continuation of our earlier quantitative studies of the economic implications of Enlargement of the European Union. Since our first studies in 1997, our work has gradually been extended to take account of important new developments in the political and economic under which the enlargement will take place. Our studies have also been gradually improved due to a more extensive commodities' and countries' coverage in the applied GTAP database.

As in all other quantitative studies the results naturally depend on the data used and the assumptions applied. Also in this study we have identified new avenues for refining our future analyses. In our future research we will address a few of these, and in particular undertake specific analyses to address the impacts in each of the 25 member countries of redesigning the Common Agricultural Policy as suggested by the EU Commission (e.g. steps in the direction of decoupled support).

To our knowledge, this study is the first analysis in which all of the new member countries are explicitly represented and dealt with in a comprehensive way. This includes a description of their existing agricultural policy, agricultural trade with each of the existing EU member countries and non-member regions, and their country-specific conditions as defined in the Copenhagen Agreement. As demonstrated in the paper, a highly differentiated picture across the individual CEECs has been drawn in terms of the expected impacts on production and trade.

We find (and this is not surprising), that the CEEC's initial agricultural protection (relative to that the EU prior to accession, i.e. the Copenhagen Agreement) and the existing trade structure (trade with old and new EU member countries as well as 3rd countries) clearly drive the results. Also, the results presented show that the CEEC's have a solid potential for increasing agricultural production, with only limited negative effects on the old EU members agricultural output.

The production of cereals in the 10 new member countries is estimated to increase by 9.3 million tonnes (or 14 per cent) with an increased net export to EU-15 of almost 3 million tonnes. The

majority of the increased production takes place in Hungary, Poland and Lithuania. In the case of meat products, production increases by 253 million tonnes of carcass weight equivalents (or by 3,3 per cent), of which 70 per cent is increased production of pork and poultry meat. The exports of pork and poultry meat from in particular Poland to EU-15 increase by almost 2 billion € – although the EU-15 also increase their export to the new member countries by almost 1,2 billion €.

Dairy production in the new member countries in 2013 appears to be significantly constrained by the quotas agreed to in Copenhagen in December 2002, given the existing milk production and its likely growth. Further, our study includes new estimates of milk quota rents in each of the existing EU-15 member countries. We find, given our initial estimates of the value of the quota rents and the assumed price, quota and productivity changes in the period 1997 to 2013 that milk quotas are no longer binding in Germany, Spain, Italy, and Sweden in 2013. This certainly has implications for the economic impacts of future reforms of EU dairy policy.

Enlarging the European Union does impose a financial burden on the old member countries. We estimate that the Copenhagen Agreement will lead to an increase in EU agricultural support expenditures of 8.6 billion € in 2013 (a 17 per cent increase). Nevertheless, the corresponding overall economic welfare losses in the old EU member countries are minimal. The expansion of the EU is in economic terms clearly affordable, not least in the light of the importance of future cooperation and development in Europe. It is also noted that the welfare effects reported in this paper do not include the effects of an extension of structural funds support, nor the important possible effects of dynamic efficiency gains from trade liberalisations, nor the potential role of foreign direct investments (e.g. enhanced capital accumulation and higher productivity growth).

Related to the WTO discussions, accession of the new member countries seems primarily to have intra-European (distributional) consequences with only minor impacts on countries outside Europe. This does not, however, remove the need for reforming the existing design of the CAP along the lines as for example suggested by the European Commission – reforms aiming at reaching a WTO compromise and enhancing economic efficiency in the enlarged European Union.

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Appendix A. The Copenhagen Agreement's final quotas, reference yields and base areas for new member states – selected key commodities

	Total milk quotas in tonnes	Base Area Ha	Reference Yield tonnes/ha	Slaughter premium (adult) number of animals	Slaughter premium (calves) number of animals	Special beef premium number of animals
Cyprus	145200	79000	2.30	21000	0	12000
Czech Republic	2737890	2253600	4.20	483382	27380	244349
Estonia	646368	362827	2.40	107800	30000	13600
Hungary	1990060	3487792	4.73	141600	94400	94620
Latvia	728650	443600	2.50	124300	53280	70200
Lithuania	1704800	1146600	2.70	367484	244200	150000
Malta	48700	4600	2.02	6000	20	3200
Poland	9380143	9454671	3.00	1815400	839500	926000
Slovak Republic	1040770	1003500	4.06	204062	62841	78348
Slovenia	576638	125200	5.27	161137	35852	92300

	Suckler cow premium number of animals	Additional payments Beef (€)	Mother ewes & goats number of animals	Sheep national envelopes (EURO)
Cyprus	500	308900	472400	441000
Czech Republic	90300	8776000	66733	71000
Estonia	13416	1134500	48000	29000
Hungary	117000	2936100	1146 000	1086000
Latvia	19400	1330680	18437	19000
Lithuania	47200	4942300	17304	18000
Malta	450	0	8500	-
Poland	325600	27300000	335900	355000
Slovak Republic	28100	4500535	305800	323000
Slovenia	86384	2964780	84900	86000

Source: Source: European Commissions Issues paper (2002), Report to the Council of the European Union (December 2002) and Agra Europe (December 2002).

Appendix B.   Supply response in EU-25, baseline 1997 – 2013, enlargement 2013, index 1997=100, and percentage change in production 2013

	Wheat			Other Grains			Oilseeds			Sugar cane and beet			Plant based fibres		
	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%
Belgium/Luxemborg	114	112	-2.0	107	107	-0.5	183	183	-0.1	100	100	0.0	236	236	0.1
Denmark	123	121	-1.4	118	116	-1.6	157	157	-0.1	101	101	0.0	311	310	-0.4
Germany	118	115	-2.6	104	101	-3.1	172	172	-0.4	99	99	0.0	234	233	-0.5
Greece	102	99	-3.4	92	91	-0.5	109	109	-0.2	101	101	0.0	146	145	-1.1
Spain	110	106	-3.1	100	99	-1.2	111	111	-0.3	121	121	0.0	145	143	-0.8
France	125	123	-2.0	99	97	-2.1	132	132	-0.1	112	113	0.2	120	120	0.0
Ireland	92	90	-2.3	86	84	-1.5	151	151	0.3	110	111	0.1	407	424	4.3
Italy	95	92	-3.6	80	80	-0.7	105	105	-0.1	106	106	-0.6	563	559	-0.8
Netherlands	92	88	-4.2	114	111	-2.7	95	92	-2.3	101	96	-4.9	125	125	-0.2
Austria	130	139	6.9	140	132	-5.9	126	123	-2.7	105	105	0.0	186	196	5.4
Portugal	175	170	-2.9	109	109	-0.2	132	133	0.3	119	119	0.0	514	513	-0.2
Finland	119	117	-1.9	108	106	-2.1	142	142	-0.2	109	109	0.1	375	336	-10.6
Sweden	140	141	0.5	173	171	-1.3	156	159	2.2	101	101	0.1	434	437	0.5
United Kingdom	117	116	-1.1	108	108	-0.4	133	132	-0.2	105	106	0.2	112	112	-0.1
Cyprus/Malta	207	384	85.5	301	675	124.2	190	243	28.0	395	411	3.9	373	197	-47.1
Czech Republic	119	120	1.4	122	130	6.6	138	144	4.3	118	110	-6.5	120	49	-58.8
Estonia	123	134	9.1	141	151	7.1	117	130	10.8	129	128	-1.1	51	34	-33.5
Hungary	97	142	46.8	104	126	20.9	115	126	9.6	112	108	-3.4	265	155	-41.5
Latvia	138	149	8.4	112	119	6.6	418	342	-18.3	133	123	-7.2	672	327	-51.3
Lithuania	158	204	29.6	113	171	51.4	211	211	0.4	113	112	-1.0	238	182	-23.4
Poland	118	118	0.0	122	136	11.2	123	111	-9.4	121	123	1.6	159	177	11.3
Slovakia	123	140	14.6	128	139	8.4	153	148	-3.1	120	115	-4.4	109	40	-63.5
Slovenia	147	134	-8.8	145	121	-16.4	158	150	-4.8	147	140	-4.8	84	39	-53.6

	Vegetables, fruit and nuts			Other crops			Bovine animals			Other animal products			Raw milk			Wool		
	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%
Belgium/Luxemborg	183	186	1.7	107	107	-0.5	106	105	-0.4	122	119	-2.2	102	102	0.0	209	205	-1.7
Denmark	195	194	-0.3	118	116	-1.6	106	106	-0.3	112	113	1.5	102	102	0.0	156	161	3.0
Germany	144	147	2.3	104	101	-3.1	94	94	-0.6	104	103	-1.6	97	100	3.2	150	149	-0.2
Greece	123	126	2.6	92	91	-0.5	105	106	0.9	107	107	-0.1	111	111	0.0	188	187	-0.6
Spain	122	126	2.7	100	99	-1.2	119	119	-0.5	127	126	-1.1	108	108	0.1	188	186	-1.3
France	172	173	0.4	99	97	-2.1	109	109	-0.5	115	114	-1.0	102	102	0.0	359	357	-0.4
Ireland	89	90	0.3	86	84	-1.5	131	130	-0.6	110	109	-1.1	103	103	0.0	266	266	0.0
Italy	104	106	1.6	80	80	-0.7	92	90	-2.0	103	103	-0.5	94	94	0.3	267	273	2.6
Netherlands	219	225	2.9	114	111	-2.7	114	112	-2.3	122	120	-1.6	102	102	0.0	183	182	-0.8
Austria	129	130	0.7	140	132	-5.9	87	87	0.5	98	98	0.0	102	102	0.0	114	113	-0.7
Portugal	151	152	0.5	109	109	-0.2	115	115	0.0	120	119	-0.1	102	102	0.0	220	220	-0.1
Finland	122	122	0.1	108	106	-2.1	100	99	-1.3	126	126	0.1	102	102	0.0	128	127	-0.3
Sweden	143	143	0.1	173	171	-1.3	94	89	-5.5	100	100	0.1	99	101	2.2	262	314	20.0
United Kingdom	160	160	0.4	108	108	-0.4	99	99	-0.3	103	103	-0.2	102	102	0.0	269	268	-0.4
Cyprus/Malta	123	168	37.4	301	675	124.2	144	198	37.6	134	143	6.7	203	107	-47.5	212	284	34.2
Czech Republic	136	101	-25.8	122	130	6.6	143	112	-21.8	118	115	-1.9	112	98	-12.6	127	103	-19.0
Estonia	129	114	-11.9	141	151	7.1	121	128	5.0	119	122	2.6	160	90	-43.5	131	128	-2.0
Hungary	138	96	-30.4	104	126	20.9	212	201	-5.2	127	131	2.8	145	100	-31.0	285	298	4.4
Latvia	139	116	-16.3	112	119	6.6	116	125	8.0	117	113	-3.6	102	74	-27.5	178	149	-16.4
Lithuania	148	127	-14.4	113	171	51.4	119	131	9.3	115	114	-0.4	152	87	-42.3	129	134	3.6
Poland	126	96	-23.4	122	136	11.2	128	155	20.4	139	146	5.1	129	77	-40.1	175	175	-0.1
Slovakia	144	103	-28.6	128	139	8.4	132	125	-5.2	124	119	-3.8	131	93	-28.9	157	141	-10.1
Slovenia	279	157	-43.8	145	121	-16.4	143	142	-0.3	133	130	-2.7	117	98	-16.4	160	149	-6.5

	Bovine meat products			Other meat products			Dairy products			Sugar			Vegetable oils and fats		
	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%
Belgium/Luxemborg	121	121	-0.3	141	138	-2.5	121	121	0.2	116	116	0.0	97	97	0.0
Denmark	119	119	-0.3	120	123	2.1	118	118	0.0	112	112	0.0	178	181	1.6
Germany	105	104	-0.6	118	116	-1.9	109	113	3.7	109	109	0.0	108	109	0.3
Greece	121	122	0.9	123	123	-0.1	127	127	-0.2	119	119	0.0	130	130	0.0
Spain	138	138	-0.5	148	147	-1.1	124	124	0.0	113	113	0.0	127	126	-0.1
France	123	122	-0.5	129	128	-1.2	113	113	0.3	109	109	0.0	105	104	-0.4
Ireland	161	160	-0.7	129	127	-1.9	124	124	0.0	126	126	0.0	174	172	-1.0
Italy	100	97	-2.7	108	107	-1.0	110	110	0.5	93	90	-2.4	124	124	-0.1
Netherlands	134	130	-2.8	145	142	-2.2	119	119	0.1	116	110	-5.3	158	161	2.0
Austria	96	97	0.7	100	100	-0.1	104	104	-0.1	110	110	0.0	107	116	8.1
Portugal	125	125	0.0	131	131	-0.1	115	115	-0.1	83	81	-2.4	149	150	0.5
Finland	113	111	-1.5	116	116	0.0	117	117	-0.2	118	118	0.0	124	125	0.4
Sweden	106	100	-5.7	113	113	0.0	113	116	2.2	116	116	0.0	159	166	4.7
United Kingdom	106	106	-0.2	112	112	-0.4	113	114	0.2	110	110	0.0	150	150	-0.3
Cyprus/Malta	195	417	113.5	148	162	9.6	263	119	-55.0	247	247	0.0	230	253	10.2
Czech Republic	248	113	-54.4	117	114	-2.6	127	113	-11.4	123	123	0.0	122	120	-1.7
Estonia	142	200	41.1	128	157	22.5	233	101	-56.7	152	152	0.0	125	111	-11.2
Hungary	445	436	-2.2	147	158	7.4	179	117	-34.8	130	123	-4.9	198	145	-26.8
Latvia	181	152	-15.9	112	76	-32.3	116	91	-22.2	175	175	0.0	142	126	-11.3
Lithuania	175	354	102.5	116	96	-16.8	258	94	-63.6	142	142	0.0	148	130	-12.0
Poland	146	241	65.0	178	193	8.0	161	56	-65.3	142	142	0.0	141	124	-12.1
Slovakia	170	130	-23.3	133	130	-2.0	155	87	-43.7	130	130	0.0	144	133	-7.8
Slovenia	455	433	-4.7	132	111	-15.9	138	107	-22.4	152	140	-7.9	180	131	-27.2

	Other processed foods			Beverages and tobacco			Textiles/wearing apparel			Natural resources			Manufactures			Services		
	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%	2013	Enl.	%
Belgium/Luxemborg	132	130	-2.2	99	100	1.1	125	120	-4.0	160	160	0.0	140	140	-0.3	128	129	0.2
Denmark	104	101	-3.4	143	146	2.5	209	229	9.7	136	136	0.0	127	126	-0.7	133	133	0.0
Germany	113	110	-2.8	133	135	1.1	113	114	1.0	135	135	0.0	118	118	0.1	123	123	-0.1
Greece	120	120	0.0	178	181	1.7	151	148	-2.0	130	130	0.0	125	125	-0.2	153	153	0.0
Spain	123	122	-0.7	157	158	0.7	120	118	-1.5	137	137	0.0	144	144	0.2	154	154	0.0
France	114	113	-1.2	134	136	1.4	132	130	-2.2	147	147	0.0	140	140	0.3	137	137	0.0
Ireland	175	171	-2.3	258	266	3.3	104	102	-2.4	144	144	0.0	284	284	0.0	198	198	0.0
Italy	111	111	-0.2	133	136	2.0	139	138	-1.1	141	140	0.0	135	136	0.2	131	131	0.0
Netherlands	140	138	-1.3	172	181	4.9	208	208	-0.3	137	137	0.0	147	146	-0.4	143	143	0.0
Austria	112	110	-1.1	152	168	10.9	270	284	5.1	156	156	0.0	132	132	0.1	140	140	-0.1
Portugal	123	123	0.0	169	171	1.2	150	146	-3.0	147	147	0.0	131	131	0.6	139	139	0.0
Finland	147	146	-0.5	162	171	5.9	123	124	0.5	161	161	-0.1	166	166	0.1	156	156	-0.1
Sweden	126	125	-1.2	189	196	3.9	208	214	2.9	163	163	0.0	143	143	-0.1	141	141	0.0
United Kingdom	118	118	-0.6	172	176	2.3	116	115	-1.2	136	136	0.0	136	136	0.1	136	136	0.0
Cyprus/Malta	241	340	40.9	203	218	7.2	236	595	151.8	144	144	-0.1	139	127	-9.0	143	140	-2.2
Czech Republic	128	132	3.3	154	137	-11.1	100	133	32.2	139	138	-0.7	149	158	5.7	134	131	-1.8
Estonia	206	260	26.2	181	173	-4.0	109	201	83.6	140	139	-0.7	137	130	-5.1	172	167	-2.9
Hungary	140	148	6.1	174	102	-41.3	63	81	27.2	138	136	-1.5	202	224	11.0	181	175	-3.0
Latvia	151	146	-3.5	229	340	48.3	169	378	124.1	153	151	-1.1	153	135	-11.9	166	163	-2.3
Lithuania	130	116	-10.6	176	101	-42.5	181	352	94.8	153	151	-1.4	91	76	-15.9	141	138	-2.6
Poland	142	180	27.0	171	101	-40.9	128	248	93.5	137	135	-0.8	151	139	-7.5	169	169	0.3
Slovakia	146	148	1.7	176	167	-4.8	114	149	30.8	150	149	-1.2	142	144	1.4	149	147	-1.4
Slovenia	155	151	-2.0	184	131	-28.7	76	107	40.2	150	148	-1.0	167	175	5.1	162	159	-2.1

Appendix C

Model and data

Adjusting the standard model
The base GTAP model (version 6.1) is a standard multi-regional, static computable general equilibrium (CGE) model. Regional production is produced according to a constant return to scale technology in a perfectly competitive environment, and the private demand system is represented by a non-homothetic demand system (a Constant Difference Elasticity function)[12]. The foreign trade structure is characterised by the Armington assumption implying imperfect substitutability between domestic and foreign goods, cf. Hertel (1998).

In order to analyse the impacts of extending the Common Agricultural Policy (CAP) to the ten Candidate Countries (CEEC), it is important to capture the key institutional features of CAP (the instruments) and the more recent Agenda 2000 reform of the CAP. We have therefore explicitly modelled the following features of the CAP, cf. Bach, Frandsen and Jensen (2000):

- Direct payments to arable land and livestock, together with set-aside requirements and base area restrictions
- Budgetary limits on the total amount allocated to land and livestock according to the institutional rules of the Common Agricultural Policy
- Milk and sugar quotas[13]
- The European Union agricultural budget and the important effects of inter-regional transfers between member states.

Database and Adjusts made
In this paper the point of departure is an interim release of the version 5 of the GTAP database, cf. Dimaranan and McDougall (2002), which spans over 74 regions/countries and covers 57 commodities. To keep the model within computational limits and focus on the issues to be analysed it is aggregated into 40 regions/countries and 24 commodities of which 12 are primary agricultural commodities and 8 are secondary. Country and commodity aggregation are shown in Table 1.

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[12] Hence, the present analysis abstracts from features such as imperfect competition and increasing return to scale, which may however be important in certain sectors.

[13] In this study the representation of the EU sugar policy is rudimentary and not as detailed as in Frandsen et al (2003). The results for the production of sugar should therefore be considered with care.

TABLE 1. Country and commodity aggregation

Country/Regions		Commodities	
Belgium/Luxembourg	Lithuania	Paddy rice	Natural resources
Denmark	Poland	Wheat	Bovine meat products
Germany	Romania	Other grains	Other meat products
Greece	Slovakia	Vegetables, fruit and nuts	Vegetable oils and fats
Spain	Slovenia	Oilseeds	Dairy products
France	North Africa	Sugar cane and beet	Processed rice
Ireland	Malawi	Plant based fibbers	Sugar
Italy	Mozambique	Other crops	Other processed foods
Netherlands	Tanzania	Bovine animals	Beverages and tobacco
Austria	Zambia	Other animal products	Textiles/wearing apparel
Portugal	Zimbabwe	Raw milk	Manufactures
Finland	Other Southern Africa	Wool	Services
Sweden	Botswana		
United Kingdom	Rest of South African Customs Union		
Bulgaria	Uganda		
Cyprus/Malta	Rest of sub-Saharan Africa		
Czech Republic	China		
Estonia	United States of America		
Hungary	Latin America and the Caribbean		
Latvia	Rest of the World		

A number of important adjustments have been made to the standard database to allow a more precise representation of the CAP instruments and the level of domestic support:

- First, the GTAP database is updated to allow for the recent adjustments as reported by the OECD secretariat (2001), i.e. the level of domestic support reflects the 1998-PSE numbers for the EU at the individual member state level in this analysis.
- Second, the database is adjusted to include all domestic support reported by the OECD's PSE tables cf. the discussion in Frandsen, Jensen and Yu (2001). The standard GTAP database does not include domestic support for vegetables, fruits and nuts, plant based fibbers and other crops.
- Third, hectare premiums given to silage crops in the EU, being included as an intermediate input subsidy, are moved to input subsidies to land and male animal premiums are moved form capital input subsidies to output subsidies.
- Fourth, the database has been adjusted to reflect the quota rents associated with the EU milk and sugar quota regimes. The data incorporated are based on two recent studies undertaken by Frandsen et al (2001) and SLI (2002).
- Fifth, the input demand structure by firms for raw milk in the CEECs has been adjusted so that raw milk is primarily used in the production of dairy produce[14].
- Sixth, initial EU tariffs are adjusted for less developed African countries in order to reflect GSP and other trade arrangements. These preferential tariff rates where estimated by the UNCTAD and the Commonwealth Secretariats in a joint study (UNCTAD 2001).
- Seventh, the common agricultural budget has been explicitly represented in the database (the 1997/98 budget) at the member state level, including the contribution of the individual member states to the financing of the agricultural expenditures.
- Finally, a few of the behavioural parameters have been adjusted. This includes the Armington elasticities, which have been doubled, compared to the standard GTAP parameter file. This has been done based on so-called back casting exercise replicating historical trade

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[14] In Poland for example 30 percent of intermediate use of raw milk by firms is used in the trade and transport sector in the initial version 5 database. This raw milk was reallocated to intermediate input to dairy production in our modified database.

data for selected countries and regions (see Gehlhar 1997). In the case of trade with live animals (livestock) Armington elasticities have been reduced to nearly zero in order to avoid unrealistic increases in trade in these products.

Among the central and eastern European countries represented in the present interim release of the GTAP Version 5 database are Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic and Slovenia, wherefore the accession analysis undertaken in this paper, model the consequences of enlarging the EU with these 10 candidate countries.


Milk Quota Rents

In the analysis undertaken in this paper the CAP milk quota regime is modelled as an output quota restricting the quantity of milk being produced.

If the quota is restricting production (binding) then consumers are paying a higher price for milk than production costs. In Figure A1 (a) this situation is depicted where the quota at quantity A restricts the milk production and consumers are paying the market price PM for milk, while the costs of production for the producer is equal to the price PS. The difference between the prices PM and PS is the so-called quota rent associated with milk production when the quota is binding.

Figure A1 (b) illustrates the situation where the milk quota A is expanded to quantity B. The increased supply lowers the consumer price PM and increases the producer price PS, reducing the quota rent per unit of output. If the quota was expanded even further to the right, beyond the intersect of supply and demand to C, then the quota would not be filled and the quota rent would be reduced to zero (PM = PS).

Figure A1. Modelling of an output quota

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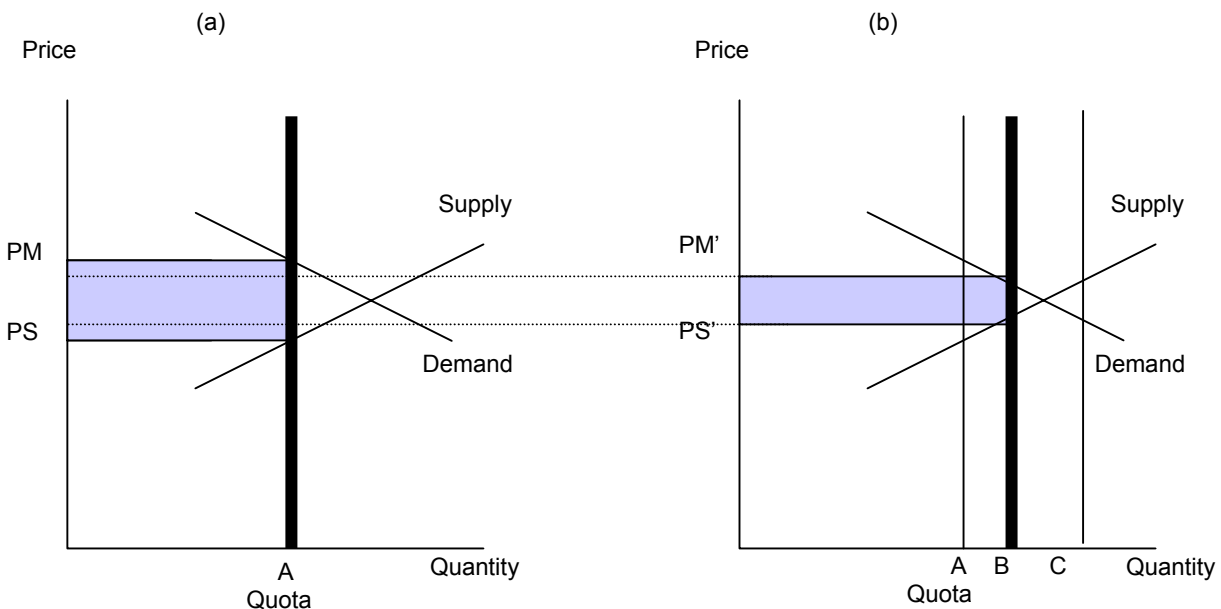
In the simple example illustrated here the supply and demand curves are fixed and the only change being made is the size of the milk quota. During the baseline period from 1997 to 2013 not only are milk quotas being expanded due to the Agenda 2000 agreement but supply and demand curves are also moving in response to income growth on the demand side and changes in relative factor prices on the other side. On top of this the Agenda 2000 agreement also reduces the consumer price PM for milk.

In the simulation under taken in this paper the milk quota rent is endogenously determined by the model and the amount of milk produced is exogenously determined in that the milk quotas are expanded in line with the Agenda 2000 agreement for the EU-15 countries during the baseline period. In the case of Germany, Spain, Italy and Sweden where the milk quota is found not to be binding in 2013, the milk quota rent is reduced to zero (PM = PS) exogenously and the quantity of milk produced is determined endogenously by the model.

In the base year 1997 all milk quotas in the EU-15 were binding wherefore all member countries initially had positive milk quota rents. In the analysis undertaken in this paper, initial quota rents are incorporated into the 1997 base year data set using the calculated quota rents as a per cent of producer prices (PS) shown in Table 1C.

Table A1. Milk quota rents in the EU-15.

	*Quota Price €/t	Value of Quota Rent €/t	*Consumer Price PM €/t	Producer Price PS €/t	Quota rent as per cent of PS %
Belgium/Lux.	785	31	300	269	12
Denmark	422	17	331	314	5
Germany	801	32	297	265	12
Greece	281	11	457	446	3
Spain	360	14	263	249	6
France	726	29	308	279	10
Ireland	429	17	265	247	7
Italy	412	16	323	307	5
Netherlands	1182	47	334	287	16
Austria	833	33	404	371	9
Portugal	400	16	299	283	6
Finland	167	7	411	404	2
Sweden	182	7	320	312	2
United Kingdom	564	23	276	253	9

Note * The estimated quota prices and the associated consumer price (PM), is based on Jansson (2002)

The calculated value of quota rents in € per tonnes, shown in Table A1 is determined by using a 4 per cent real interest rate with infinity depreciation time. This corresponds to an annual cost of 0.04 times the cost of acquisition (the quota price).

The method used in a number of other studies (having estimated the value of quota rents, cf Jansson (2002)), a shorter depreciation time was typically used (8 years) to calculate annual quota cost, increasing the value of initial quota rents substantially compared to the rents used in this paper. This difference in depreciation time raises the question as to whether or not farmers expect to get compensatory payments for any changes made to the quota system. By using an infinity depreciation time, the quota rents used in this study assume that farmers do expect to be

compensated for any future changes made to the CAP dairy regime. Looking back this has typically been the policy in past reforms.[15]

In Table A2 the initial quota rents as a per cent of the price PS is shown for the base year 1997 together with the resulting quota rents in 2013 pre and post enlargement.

Table A2. Milk quota rents, per cent.

	1997	2013 pre	2013 post
Belgium/Luxemborg	12	26	28
Denmark	5	23	27
Germany	12	0	0
Greece	3	7	9
Spain	6	0	0
France	10	21	24
Ireland	7	30	31
Italy	5	0	0
Netherlands	16	30	32
Austria	9	3	7
Portugal	6	89	90
Finland	2	1	4
Sweden	2	0	0
United Kingdom	9	10	15

Note: The introduction of new dairy premium (17.24 € per tonne) and the additional payment to milk producers (7.75 € per tonne) in the baseline (Agenda 2000) implies that the producer price plus the premium decline. The relative change in this price and the market price determines the impact on the quota rent in the baseline (as well as changes in the quota quantity and price changes in general in the baseline).

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[15] The Agenda 2000 reform of the CAP compensated farmer with 17.24 € per ton of quota for price reductions.