

European Commission
Directorate General for Agriculture

**Analysis of the Impact on Agricultural
Markets and Incomes of EU Enlargement
to the CEECs**

March 2002

FOREWORD

This report has been prepared by the Directorate General for Agriculture of the European Commission in the framework of the analyses carried out in preparation for the approaching EU enlargement. It is aimed at providing a clear picture of the possible impact of different enlargement scenarios on agricultural markets and on farm incomes in the Central and Eastern European Countries (CEECs) as well as in the EU-15.

The report examines three different accession scenarios: (1) accession without direct payments, (2) accession with full direct payments and (3) accession according to the negotiating position of the Candidate Countries. In the first two scenarios reference quantities are based on a recent reference period. In the third scenario, reference quantities are those requested by Candidate Countries. The proposals presented by the Commission in its Issues Paper "Enlargement and Agriculture: Successfully Integrating the new Member States into the CAP" (SEC (2002) 95 final, of January 30, 2002) represent, in a certain fashion, an intermediate choice between these different scenarios.

Although the impact of these specific proposals is not examined in the report, it nevertheless provides a lot of useful information in this respect since it includes the results of quite a wide range of assumptions as far as the conditions for accession are concerned. The results of the simulations are also compared with those obtained under the assumption of unchanged policies and non-accession.

As is the case for all similar impact analyses, the results of the simulations carried for this report are not intended to constitute a forecast of what the future will be, but rather provide an indication of what may happen under certain circumstances, which at the time of the projections were judged as the most plausible. Specific characteristics prevailing in the CEECs, such as the duality of farm structures, and an assessment of production potential, have been explicitly included. Moreover, enlargement effects on the EU-15 and the EU-25 have also been included, which allows for assessing the likely competitiveness of the current and the new member countries.

TABLE OF CONTENT

FOREWORD	2
EXECUTIVE SUMMARY	5
1. INTRODUCTION	15
2. POLICY SCENARIOS AND MAIN ASSUMPTIONS	16
2.1. Macroeconomic Assumptions	17
2.2. Policy Assumptions	19
2.3. Selection of the Base Period for the Impact Assessment.....	21
3. NON-ACCESSION AND UNCHANGED DOMESTIC POLICIES (BASELINE)	21
4. DEVELOPMENTS IN AGRICULTURAL MARKETS IN THE ACCESSION SCENARIOS	23
4.1. Pork and Poultry Markets in the CEECs	23
4.2. Cereal and Oilseed Production in the CEECs	25
4.2.1. Overview of the Main Results for Production.....	25
4.2.2. The Impact of Direct Payments and Set-aside on Exportable Market Surpluses in the CEECs	31
4.3. Beef, Milk and Dairy Production in the CEECs.....	35
4.3.1. The Take-Off Scenario.....	36
4.3.2. The Potential Milk Production in the CEECs.....	38
4.4. Accession Scenarios: A Country by Country Perspective	41
4.5. Underlying Medium and Long-Term Trends of Agricultural Markets in the CEECs with a View to Accession	46
5. A PERSPECTIVE FOR THE ENLARGED EU	47
5.1. The Markets for Cereals and Grain Fed Livestock	48
5.2. Markets for Beef	51
5.3. Markets for Milk and Dairy Products.....	52

6. THE DEVELOPMENT OF AGRICULTURAL OUTPUT AND INCOME IN THE CEECS AND THE EU-15.....	55
7. CONCLUSIONS FOR AGRICULTURAL MARKETS IN THE ENLARGED UNION	63
8. REFERENCES	66
9. ANNEX 1: METHODOLOGICAL NOTES	66
10. ANNEX 2: THE ROLE OF AGRICULTURE IN THE CANDIDATE COUNTRIES AND THE EU15.....	74
11. ANNEX 3: MODEL RESULTS.....	76
12. ANNEX 4: IMPACT ANALYSES OF EU ENLARGEMENT TO THE CEECS IN LITERATURE.....	84

EXECUTIVE SUMMARY

Integration of the Central and Eastern European Countries (CEECs) has been one of the main political priorities of the EU since the early 1990s. At present 13 Candidate Countries are preparing for accession, the 10 CEECs, Cyprus, Malta, and Turkey. Agricultural integration is an important aspect not only in political but also in economic terms. This report concentrates on the impact analysis of the accession of 10 CEECs without prejudice to either the date or order of entry.

The contribution of agriculture to the economies of Central and Eastern Europe is relatively more important than in most current Member States of the EU. For example in the year 2000 agriculture in the CEECs produced 4.6% of the Gross Domestic Product (GDP), compared to 2% in the EU-15. Employment in agriculture is 21% compared to only 4.3% of the active work force in the EU-15.

However, large country specific differences exist among the Candidate Countries. The contribution to GDP varies between 15.8% in Bulgaria and 2.9% in Slovenia. The equivalent range for the Member States is between 6.6% in Greece and 0.6% in Luxembourg. The high average employment in agriculture in the CEECs is mainly explained by Romania, Poland, and Lithuania, where 42%, 18.8% and 19.6%, respectively, of the active work force is in the agricultural sector. In the other CEECs the share of employment in agriculture is comparable to the figures in the Member States.

Since the beginning of the 1990s agriculture in the CEECs has changed significantly. Despite vast natural resources in terms of area, agriculture has not been able to exploit this potential to its full extent. In spite of huge efforts and – in most countries - successful developments, restructuring of agriculture and the food industries is still far from being complete.

Neither the scale of the integration foreseen in the next rounds of accession, nor the combination of patterns and characteristics of agriculture, food processing, and rural economies are comparable with the past enlargements of the EU. Integration into the EU will mean giving the CEECs' agriculture and food processing industries access to 375 Mill. affluent consumers in the EU-15 in addition to the 100 Mill. on their domestic markets. In turn it will also mean that the EU-15 agriculture and food processing gain access to the dynamic markets in the CEECs.

This report is aimed at presenting the results of a set of simulations on the possible impact of enlargement on agricultural markets for the main agricultural commodities in the CEECs, on the basis of different alternative assumptions on the conditions for accession. The results of the simulations are compared with those obtained under the assumption of unchanged policies and non-accession.

For analytical reasons, the working assumption has been taken that all Central and Eastern European Candidate Countries have obtained membership by 2007. To observe some of the long-term effects, projections have also been carried out for 2012.

For the purpose of this impact assessment four different policy scenarios have been considered each of them describing a possible evolution of agricultural policies in the CEECs and the EU-15 as well as entry and integration into the single market:

(i) *baseline*, which assumes non accession and unchanged agricultural policies in the CEECs,

(ii) the implementation of the CAP *without* direct payments. Production quotas are based on a recent reference period (*CAP*);

(iii) the implementation of the CAP *with* full direct payments and quotas. The reference quantities are based on recent reference periods (*CAP DP*);

(iv) and finally the implementation of the CAP *with* full requested direct payments and quotas. The reference quantities are based on the negotiation position of the Candidate Countries submitted up to July 2001 (*CC Position*).

The economic effects of rural development measures and structural funds on rural areas and agriculture have not been taken into account.

General Trends in the Agricultural Markets of the CEECs and the enlarged EU

The *baseline* results show that agriculture in the CEECs appears to be still under adjustment pressure. In particular, the labour-intensive part of production with comparably low value added might undergo significant restructuring in the simulation period: beef and milk production could further significantly decline. Even the competitiveness of more capital-intensive production such as cereals seems to suffer from macroeconomic developments, particularly the appreciation of the real exchange rate. Only in areas where a more protective policy is in place, such as for pork and poultry, could production develop more positively.

These developments generally confirm the past trends of markets in the CEECs, where despite price increases agricultural production generally has responded only to a limited extent. This has occurred even in countries such as the Czech Republic and Hungary where small-scale agriculture represents a minor part of agricultural production and food consumption. This shows that agriculture as a whole has not been able to restructure production technologies fast enough to offset the competitive pressures.

The CAP provides favourable conditions for crop and cattle production, due to the level of prices as well as of direct payments. The outlook for the grain-fed livestock, especially pork is less favourable.

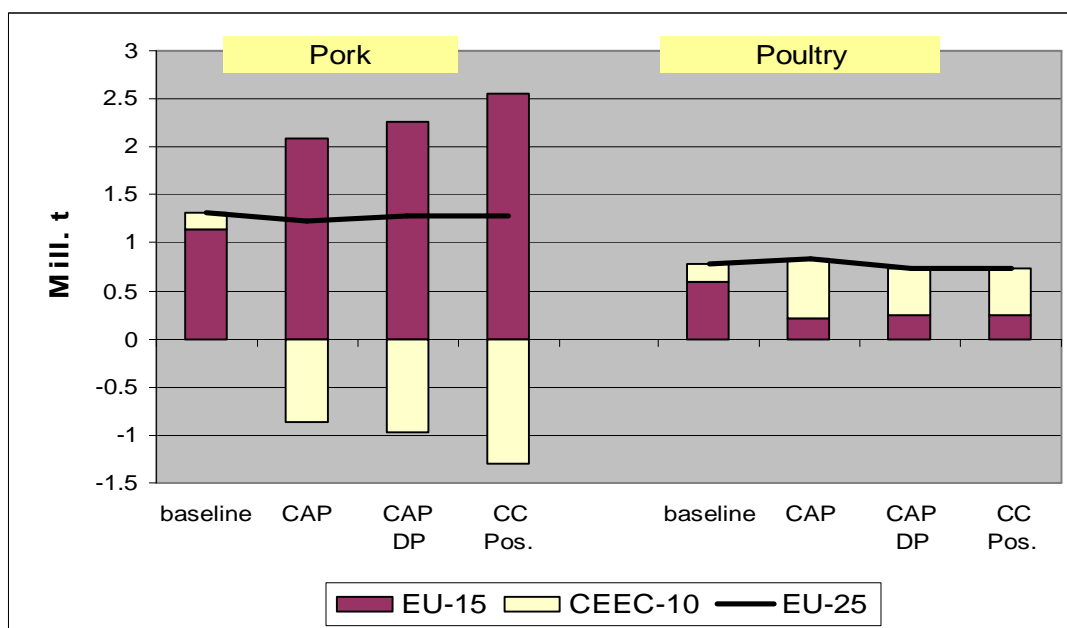
Accession of the CEECs to the EU would not lead to new challenges on the markets of an enlarged EU. To be more precise, it would just accentuates the existing ones, which is the case, for example for coarse grains. The increasing specialisation of agricultural production displayed in the simulation results is of mutual benefit as countries are allowed to benefit from their special patterns of competitiveness. Restructuring remains one of most important challenges for most of the CEECs' agricultural sectors under CAP conditions, especially in livestock production.

The Shift of Pork and Poultry Production in the EU-25

Pork producers in the EU are likely to benefit from enlargement and are expected to produce approximately 1 Mill. t more than without accession to serve CEECs' markets. The CEECs face a partial collapse of pork production on accession (-0.9 to -1 Mill. t), compared to the levels of production in the *baseline* scenario. Two main factors lead to this development: (1) high quality pork carcass prices in the CEECs are consistently and significantly higher than in the EU-15 and (2) inefficient feed use should lead to increasing costs and additional adjustment pressures upon enlargement. However, after the initial

decline pork production in the CEECs is foreseen to increase again by 0.3 to 0.5 Mill. t between 2007 and 2012.

Figure 1: Development of marketable surpluses¹ for pork and poultry in the EU-15, the CEECs and the EU-25 in 2007



Poultry production in the CEECs might enjoy an increase on accession mainly because market prices do tend to increase on accession. Production of poultry in the CEECs could expand by approximately 0.3 Mill. t by 2007 but is expected to remain stagnant afterwards such that producers in the EU-15 would mainly benefit from growing markets in the CEECs and would be able to increase production again.

Cereal Markets in the EU-25 and the Impact of Direct Payments and Set Aside

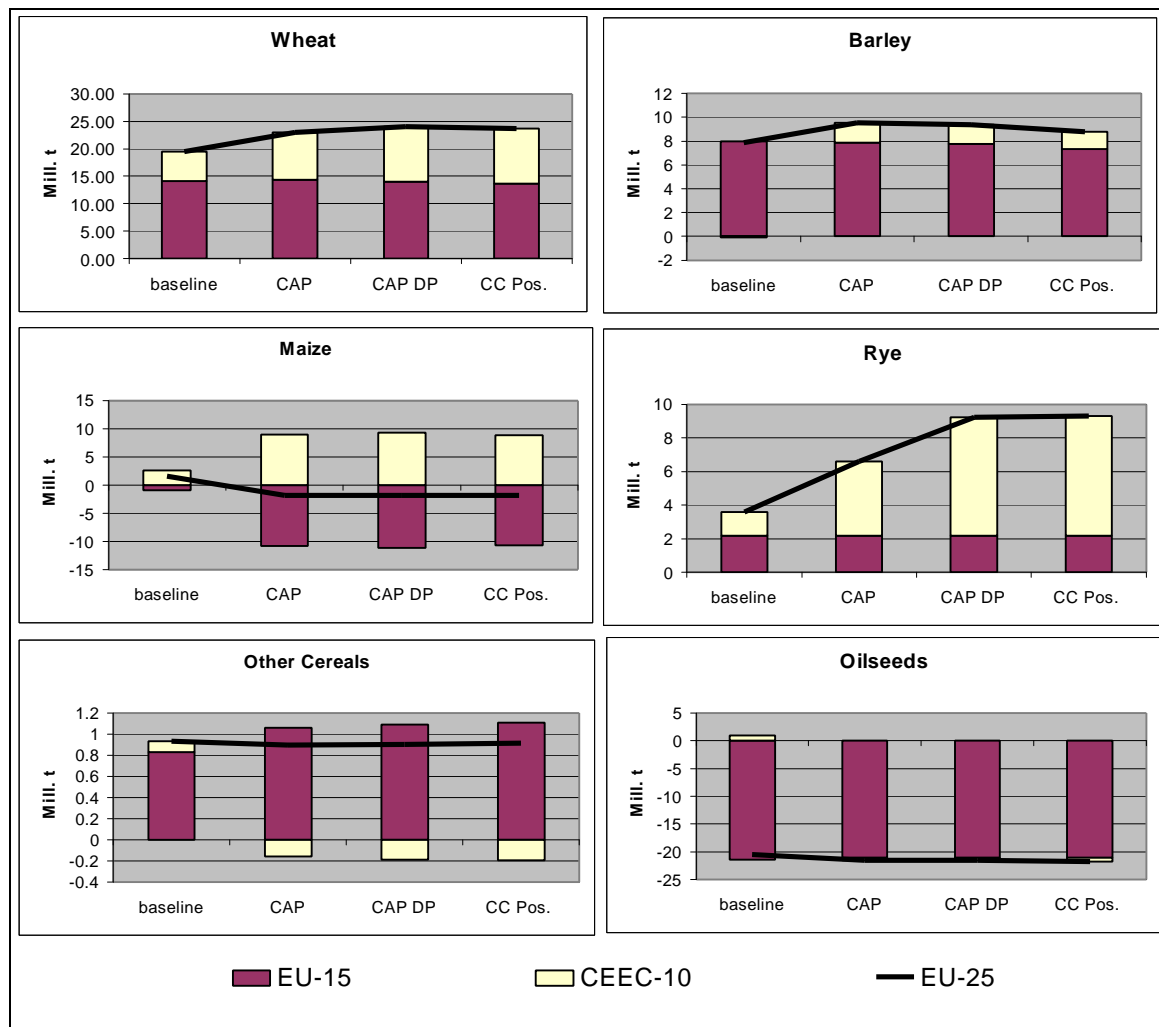
In the base period the CEECs produce 75 Mill. t and the EU-15 208 Mill. t of cereals. Under domestic policies without accession in 2007, production is foreseen to increase to 83.4 Mill. t in the CEECs and 221 Mill. t in the EU-15. In the accession scenarios in 2007 the CEECs might add approximately 92 Mill. t to 97 Mill. t, i.e. 10-14 Mill. t of cereals more than without accession, to the production of approximately 220 Mill. t in the EU-15. It is foreseen that between 2007 and 2012 the EU-25 would expand production by some further 7 to 9 Mill. t to approximately 323 Mill. t.

Domestic use in the CEECs and the EU-15 is expected to expand modestly in all accession scenarios from levels of 256 Mill. t in the base period with accession to 271-274 Mill. t in 2007 and to 277-279 Mill. t. in 2012. Marketable surpluses of cereals in the EU-25 in 2007 might reach levels of 38 to 41 Mill. t compared to 24 Mill. t in the EU-15 and 9.5 Mill. t in the CEECs without accession. The marketable surplus of the EU-25 might increase to levels of 39 Mill. t and 45 Mill. t in 2012, depending on the terms of accession.

¹ Marketable surplus and market deficit are defined as the difference between production and total domestic use.

In 2007 the market surpluses of the EU-25 are expected to consist mainly of wheat (23 Mill. t), barley (8 to 9 Mill. t) and rye (6 Mill. t to 9 Mill. t). The EU-25 might have a market deficit for maize of approximately 1.5 to 1.8 Mill. t and continue to have market surpluses of other grains of around 2.3 Mill. t.

Figure 1: Marketable Surplus for Cereals and Oilseeds in the CEEC-10, the EU-15 and the EU-25 in 2007



As a result of increasing livestock production in the EU-15 and lower maize prices, feed demand in the EU-15 is expected to expand by around 5-6 Mill. t. Moreover, lower prices, mainly for maize, might lead to a decrease of production of cereals by 1-3 Mill. t. in the EU-15. Therefore, market surpluses of the EU-15 are projected to drop by 4 to 9 Mill. t compared to non-accession in *baseline*. In the CEECs the favourable prices for rye and maize might lead to a significant growth of production upon accession. Rye production in particular is expected to increase due to a decline in production for the close substitute triticale. As a result, cereal surpluses in the CEECs could reach levels of 23-27 Mill. t, of this approximately 9 Mill. t of maize, 4-7 Mill. t of rye, and 9-10 Mill. t of wheat (see Figure 1).

The surpluses of wheat in the new Member Countries should not cause major difficulties, as world wheat prices would develop above EU intervention prices. Therefore, wheat should be competitive on world markets without export refunds. Maize surpluses would

be internally absorbed². On the other hand, the high amount of rye market surplus could create a serious problem on the small world markets for rye, such that intervention stocks would have to play a dominant role in long-term marketing of this cereal.

Due to the special situation caused by transition, the introduction of full direct payments in the CEECs could lead to an initial shock, which could affect the allocation of area and could attract additional area for cereals and oilseeds. During transition a considerable amount of area was shifted to fodder and pasture area and to fallow land. Fodder and pasture area expanded by 4.5 Mill. ha from 9 Mill. ha in 1987 to 13.5 Mill. ha in 2000, despite a substantial reduction of cattle (and sheep) numbers of approximately 49%. The amount of fallow land expanded and can be estimated at approximately 2 Mill. ha. Additionally a relatively large part of the area (compared to the EU-15) is used for producing low value added crops like feed potatoes. The additional land that might be available for cereal and oilseed production could be approximately 6.5 to 7.5 Mill. ha. This land reserve may be even larger, if part of the permanent grassland is of a quality high enough to justify a conversion into arable area.

In the scenarios with full direct payments, cereals and oilseeds would attract additional area from the land reserve. The simulation results show, however, that direct payments for area would trigger considerably less additional area than the available land reserve of 6.5 to 7.5 Mill. ha. Compared to *CAP* the overall gross expansion is approximately 3.7 Mill. ha and 3.9 Mill. ha, in *CAP DP* and *CC Position*, respectively. Set-aside, as a supply-limiting tool with an assumed reference rate of 10%, is projected to reduce the area by 1.2 Mill. ha and 1.3 Mill. ha, respectively³. The net effect of introducing full direct payments therefore is 2.5 Mill. ha and 2.6 Mill. ha, respectively.

The mobilisation of less than the theoretical available additional area is due to two main reasons: (i) firstly, the level of direct payments per hectare could mobilise only a part of the potential land reserve; (ii) since the base areas are established upon historical references, additional area would lead to an overshoot which would be penalised by a reduction of direct payments per hectare.

A higher volume of direct payments due to higher references (base area and base yields) in *CC Position* would have only a limited effect on the expansion of cereal and oilseed area. In general, direct payments appear to favour those cereals, that would otherwise be less competitive (see Figure 2). High volumes of direct payments even could divert some area away from sugar beet production. This is only expected to take place, however, only in the Baltic countries where comparably poor cost structures combine with adverse natural conditions for sugarbeet production.

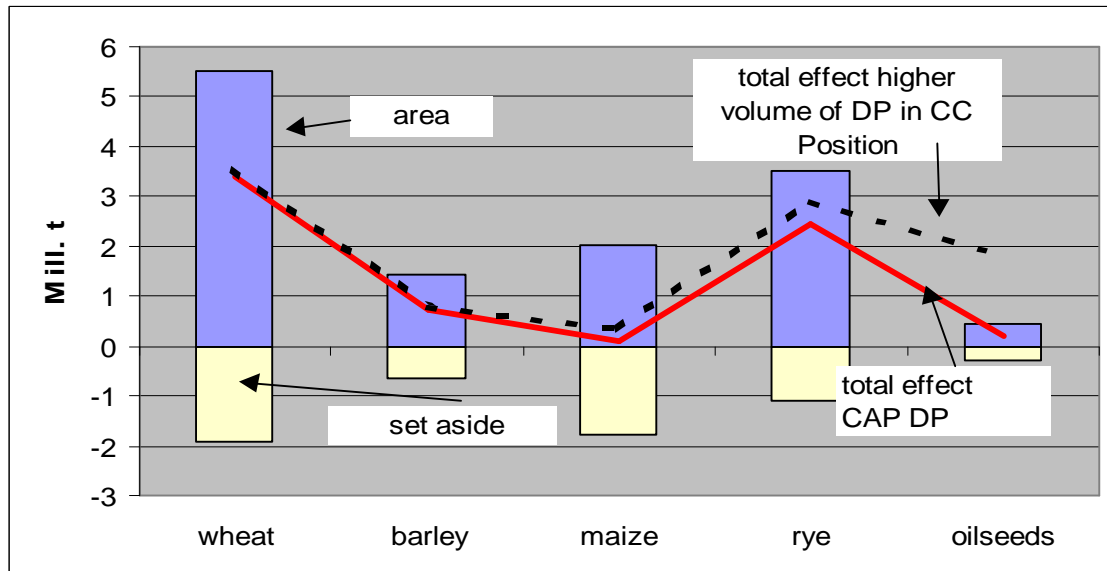
In 2007 the granting of full direct payments would increase production of cereals in the CEECs to approximately 5 Mill. t more than the implementation of *CAP* without direct payments. Most of that increase could materialise in rye and in wheat (see Figure 2). Higher cereal prices on the other hand would increase production by 8.8 Mill. t. These results indicate that despite the very specific situation in the CEECs, the introduction of

² One should note however that high transport costs from the main surplus regions in the CEECs, namely Hungary and Bulgaria, to the main deficit regions in the EU-15 could lead to sales into intervention.

³ The low rate of effective set aside is explained by the large share of small producers in countries like Poland, Romania and Hungary, in which small producer farm between 60 and 75 percent of the arable area.

full direct payments would have a significantly lower effect on production than the price effect.

Figure 2: The Effects of Direct Payments and Set-aside on Production of Cereals and Oilseeds in the CEECs in 2012.



The simulation results show that the introduction of full direct payments in the CEECs would give a different incentive to agricultural production than in the EU-15. Accession in the CEECs would generally increase cereal prices, in particular those for coarse grains, which would create a positive impact on profitability of cereal production. In the CEECs direct payments would tend to have an additional effect on the profitability of cereals and oilseeds. In the EU-15, on the other hand, direct payments partly compensate the decrease of intervention prices for cereals.

Beef Markets in the EU-25, Milk Quotas and Cattle Premiums in the CEECs

The decline in cattle herds in the CEECs projected under current domestic policies in *baseline*, reverses in the accession scenarios. The major factor determining beef production in the CEECs after accession is the level of the milk quota, because the majority of calves are born in the dairy herds and specialised beef production is of minor importance. This close link between milk and beef production, is foreseen to leave production high, if Candidate Countries claim milk quotas related to production levels of the early 1990s. On the other hand, milk quotas based on a reference period of 1995 to 1999 as in *CAP* and *CAP DP*, would lead only to a moderate increase of beef production in the CEECs and relatively minor market surpluses of 0.1 Mill. t.

Cattle premiums increase the profitability of beef production in the CEECs. The moderate volume based on production figures of 1995 to 1999 in *CAP DP* is foreseen to increase production relatively little. However, cattle premiums could lead to a slight restructuring of the beef herd towards more specialised beef cattle production. This is more visible in *CC Position*, where increased volumes of direct payments due to higher references as requested by the Candidate Countries could lead to a beef production more independent

from that of the dairy herd and to higher market surplus. The *CC Position* scenario affects the beef markets in the EU-15 to a greater extent than the other scenarios.

The increased number of beef premium rights in *CC Position* would augment surpluses in the CEECs, which are foreseen to affect markets in the EU-15. Beef markets in the EU-25 are foreseen to display sufficient flexibility to absorb the effects of accession, if consumption develops back to normal levels and no major change in consumer preferences occur. The average price decline in the EU-25 would be the highest of the three accession scenarios with between 50€/t to 70€/t. Production in the EU-15 is projected to be more flexible than beef production in the CEECs and would react with a decline, and consumption in the EU-15 would increase.

It can be expected that in the first years after accession eventual surpluses of the CEECs would mainly consist of lower average qualities than that of the EU-15. Under these conditions pressure on prices for lower qualities would increase, while higher qualities would be less affected.

Milk Production and Quota Levels in the CEECs

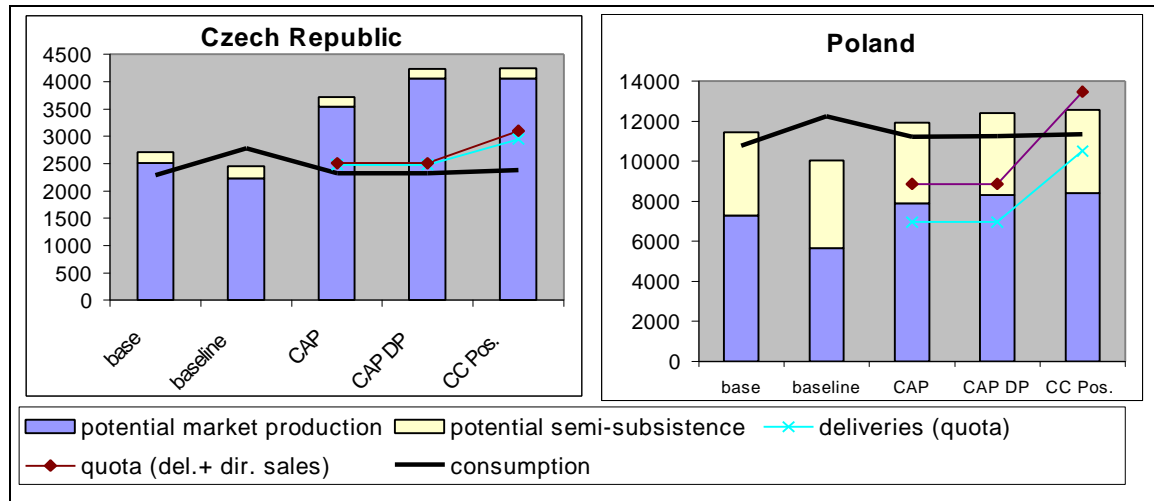
The impact of enlargement on dairy markets depends on the level of quotas fixed on accession and the structure of dairy production in the CEECs as well as in the EU-15. The analysis distinguishes between *market-oriented production* which would combine deliveries as well as commercial direct sales, and *subsistence* and *semi-subsistence* production of small farms. Quotas would affect the market-oriented production, while the subsistence sector (own-consumption) of the production would largely remain unaffected by these supply management tools.

The simulations in *CC Position* show the huge task of restructuring in order to fill the requested quota levels. Total milk production, which includes subsistence and semi-subsistence, would not reach the requested quota levels in the CEECs. Only after a longer adjustment period until 2015, would milk production reach the levels of 34.45 Mill. t. This level is even below the quota level of 34.8 Mill. t requested by the Candidate Countries. The scenarios CAP and CAP DP would increase production to 26.3 and 26.9 Mill. t.

Taking all 10 CEECs together, potential deliveries to dairies - which might be taken as an indicator of the production potential of market-oriented milk production and would include the relatively high part of the CEEC quota currently reserved for direct sales - could be 21.9 Mill. t under CAP. With direct payments the potential market-oriented production could increase to 24 Mill. t and under CC Position to 24.3 Mill. t. However, taking into account that the quota level will be binding the real market-oriented production (deliveries and direct sales) would be lower at levels of 20.4 Mill. t, 20.6 Mill. t and 22.7 Mill. t in CAP, CAP DP, and CC Position, respectively. The EU-25 could produce around 151 to 156 Mill. t of milk by 2012.

In the Czech Republic, Slovakia, Lithuania and Hungary potential market-oriented production is projected to match or even surpass the quota levels. This indicates that a quota based on recent references would become binding. Especially the Czech Republic and Slovakia show a large potential of production under CAP conditions. Estonia is foreseen to be able to expand market-oriented production in the event that direct payments are granted.

Figure 3: Potential market-oriented production, semi-subsistence production, consumption and levels of milk quotas in the Czech Republic and Poland in the base and 2012 ('000 t)



For the other countries, the picture appears rather mixed: in Bulgaria, Poland, Latvia and Slovenia market production would seem to be just able to fulfil the quotas based on a recent reference period. Under larger quota ceilings in *CC Position*, market-oriented production could not reach the requested levels in Poland, Romania, and Latvia.

In a number of CEECs direct sales and subsistence production have a significant share in domestic consumption. With declining subsistence in the course of economic development and consequently changing consumption habits, a larger share of consumption would have to be satisfied by the markets and dairy production.

The critical question as to how the quotas once introduced in the CEECs might affect restructuring has not been addressed in this quantitative analysis. The scenarios assume that the transfer of quotas between producers could take place without incurring costs, which in reality is evidently not the case. In reality market-oriented farmers would have to purchase producer rights from the semi-subsistence sector. This part of the investments would then not be available for improving profitability and the income base of market-oriented farmers. With regards to the huge task of restructuring faced by the CEECs relative to most existing EU Member States, the question of restructuring and the implementation of milk quotas is of immense importance for the Candidate Countries.

Dairy Markets in the EU-25

Following the Agenda 2000 reform in the EU-15, consumption of fresh dairy products and cheese should increase and dairy production should restructure towards this more profitable segment of the markets. This development is also visible in most CEECs. Despite these developments, which would draw milk away from the production of skimmed milk powder and butter, surpluses of butter in particular would continue to increase in the EU-15. The new members might bring in some additional market surpluses in particular for butter, despite having a similar trend in restructuring of the dairy sector than in the EU-15.

The Impact of Enlargement on Income in the CEECs and the EU-15

The analysed adjustment pressures and developments for agriculture visible in the baseline scenario are foreseen to be different between countries owing to different macroeconomic development and different cost structures of agricultural production.

Another major factor in the future developments of the agricultural sectors of the CEECs is the dualistic structure, which differs in importance from country to country. The subsistence and semi-subsistence part and a market-oriented part of agriculture coexist and compete for the resources such as land and capital. Subsistence and semi-subsistence farming has proved to be a stable feature and a main factor of stabilisation of production during the early phase of transition. In recent years, the share of subsistence and semi-subsistence farmers even increased in some countries.

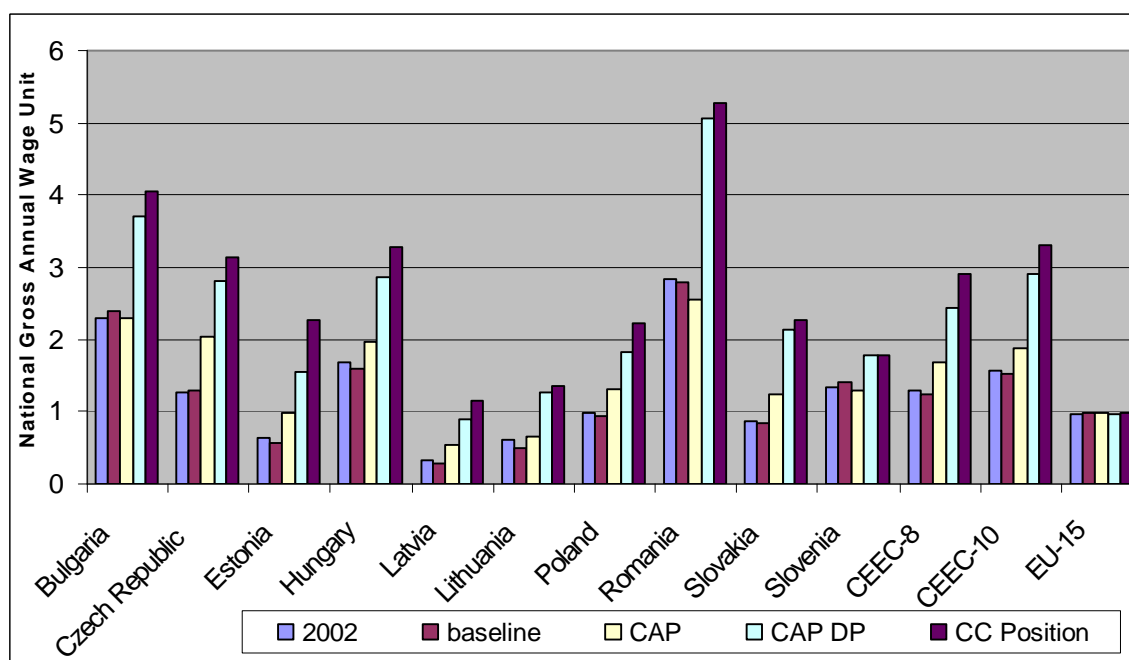
The increasing pressure on agriculture might therefore be only partly expressed in declining agricultural production but consequently more in deteriorating agricultural income per employee in general, and for the semi-subsistence sector in particular. This might highlight an increasing rural poverty problem for some CEECs under existing domestic policies.

To abstract from over-employment in agriculture in some CEECs, hypothetical 20 hectare farms have been constructed for all Candidate Countries and the EU-15. The income of these farms is then put into relation with the national average annual wage.

Domestic policies projected to 2007 and non-accession (*baseline*) would lead to a reduction of income for a number of countries, especially when exchange rate appreciation would lead to a further pressure on agriculture. Only the Czech Republic and Slovakia could manage well because the technical progress is projected to offsets these pressures provided that the general macroeconomic developments are stable.

In 2002 under current policy conditions an average 20 hectare farm provides income at the level of an annual gross average wage in the Czech Republic, Hungary, Poland, Slovenia, and also more or less so in Slovakia. Low income in the rest of the economy in Bulgaria and Romania means that a 20 hectare farm would produce 2 to 3 times more income than an average employment outside agriculture, despite comparably low income levels per hectare of land. However, the Baltic countries' types of farms would produce significantly less income combining low productivity (Latvia and Lithuania) with relatively high agricultural prices or high productivity with relatively low prices (Estonia).

Figure 4: Relative income* of a 20 ha farm in 2002 and 2007 (GVA/gross average annual wage)



* GVA in basic prices including direct payments.

Enlargement, even without direct payments, is likely to lead to an improvement of the income situation in most countries. In other countries, enlargement would offset declining income between 2002 and 2007. Only Romania with a non-competitive livestock sector and Slovenia, which may face a decline in agricultural prices, would see a reduction of income on accession without direct payments. However, a 20 hectare farm in Slovenia only sees a very slight decline.

Full direct payments under *CAP DP* would lead to a further improvement of the income situation such that agricultural income in most countries far outweighs wages outside agriculture. The hypothetical Polish farm would produce almost 2 national wages instead of 1.25 wage units without direct payments. In Hungary and the Czech Republic full direct payments leads to an income increase from 2 national wage units to 3. The low-income situation in Bulgaria and Romania would lead to a high increase of relative agricultural income once full direct payments would be granted.

In conclusion, accession without direct payments would lead to favourable income increase in the eight CEECs, where the income of a 20 hectare farm would increase by 0.6 wages from 1.2 wages in *baseline* to 1.8 wages after accession. Full direct payments based on recent reference periods (*CAP DP*) increases incomes by further 0.8 wages to 2.6 average annual gross wages. With direct payments based on the requests of the CEECs (*CC Position*) income increases roughly by 1.2 wages to 3 national wages compared *CAP*. The application of full direct could result in some countries in a large income increase relative to the national wage level. This could support arguments about increasing inequalities in rural areas. In such a situation it is favourable for labour, to stay in agriculture instead of seeking employment outside agriculture.

1. INTRODUCTION

Integration of the Central and Eastern European Countries (CEECs) has been one of the main political priorities of the EU since the early 1990s. At present 13 Candidate Countries are preparing for accession, of which the 10 CEECs, Cyprus and Malta are the frontrunners. Agricultural integration is an important aspect not only in political but also in economic terms.

The contribution of agriculture to the economies of Central and Eastern Europe is relatively more important than in most current Member States of the EU. For example in 2000 agriculture in the CEECs produced 4.6% of the Gross Domestic Product (GDP), compared to 2% in the EU-15. Employment in agriculture is 21% compared to only 4.3% of the active work force in the EU-15.

However, large country specific differences exist among the Candidate Countries. The contribution to GDP varies between 15.8% in Bulgaria and 2.9% in Slovenia. The equivalent range for the Member States is between 6.6% in Greece and 0.6% in Luxembourg. The high average employment in agriculture in the CEECs is mainly explained by Romania, Poland, and Lithuania, where 42%, 18.8% and 19.6%, respectively, of the active work force is in the agricultural sector. In the other CEECs the share of employment in agriculture is comparable to the figures in the Member States.

Accession of the CEECs would increase agricultural area of the EU by 45%, double employment in agriculture, increase population by 28% and GDP by 11%, measured in purchasing power standards. These figures suggest that the enlarged EU will be more agricultural than the EU-15. This would be even more evident, if we include Turkey.

Since the beginning of the 1990s agriculture in the CEECs has changed significantly. Despite vast natural resources, in terms of area, agriculture has not been able to use this potential to its full extent. In spite of huge efforts and – in most countries – successful developments, restructuring of agriculture and the food industries is still far from being complete.

Neither the scale of the integration foreseen in the next rounds of accession, nor the combination of patterns and characteristics of agriculture and food processing, are comparable with the past enlargements of the EU. Integration into the EU means access of CEECs' agriculture and food processing to 375 Mill. affluent consumers in the EU-15 in addition to the 100 Mill. on their domestic markets. In turn it also means that EU-15 agriculture and food processing also have access to the dynamic markets in the CEECs.

Agriculture and food industries of current and new members will compete with each other on the markets of the larger EU for shares in consumption. The relative competitiveness of agricultural production and food industries will be a major determinant for the specific development of agri-food production in the current and new Member States of the EU and the pattern of specialisation in each member country.

This report is aimed at presenting the results of a set of simulations on the possible impact of enlargement on the medium and long-term developments of agricultural markets for the main agricultural commodities in the CEECs, on the basis of different alternative assumptions on the conditions for accession. The results of the simulations are compared with those obtained under the assumption of unchanged policies and non-accession scenarios, which is assumed to be the reference scenario.

For analytical reasons, and not prejudging in any way the outcome of negotiations nor the future position of the EU, the working assumption has been taken that all CEE Candidate Countries have obtained membership by 2007. To observe some of the long-term effects, projections have also been carried out for 2012.

The main tool used for the analysis is a modified version of the European Simulation Model (ESIM), which has been used for numerous analyses of enlargement issues (see Methodological Annex).

The report begins with a presentation of the main assumptions and scenarios. The underlying long-term trends of CEECs agricultural markets under unchanged policies and non-accession are summarised and serve as a basis to analyse the effects of accession under different scenarios for the CEECs. This part contains a detailed analysis of market effects of direct payments and set-aside as well as an analysis of the effects of different milk quota levels and the influence of subsistence milk production. There then follows a detailed presentation of market effects for the EU-25, which includes effects for the EU-15.

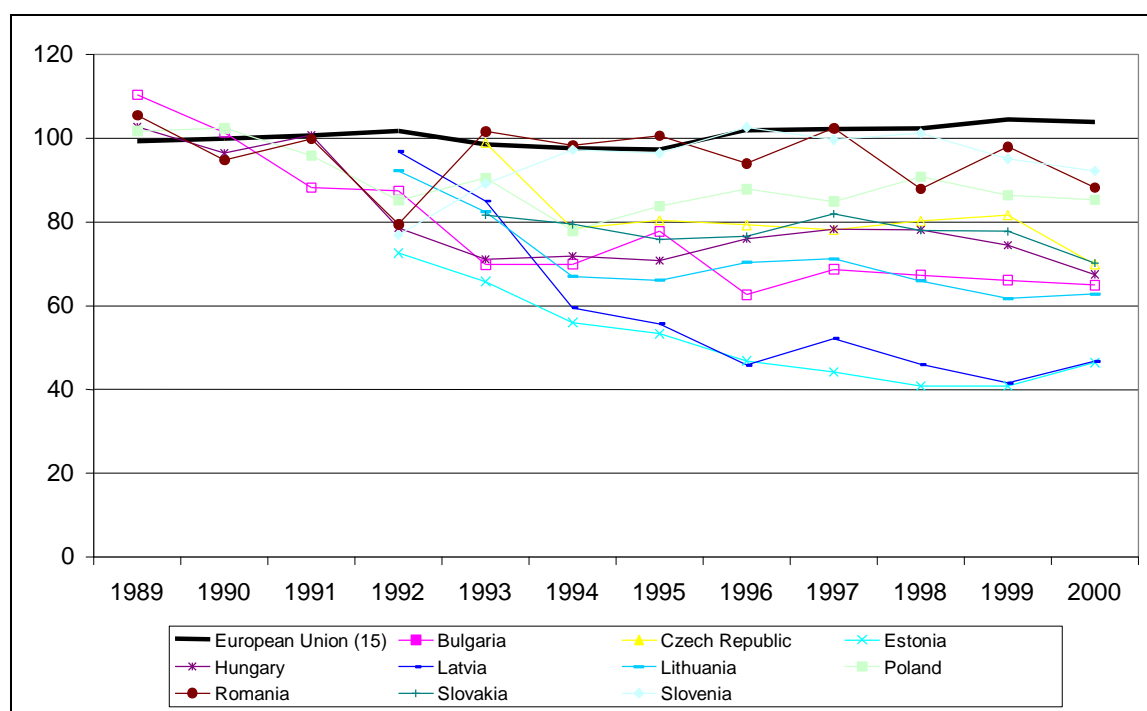
2. POLICY SCENARIOS AND MAIN ASSUMPTIONS

In recent years agriculture in the CEECs has had to respond to numerous developments and changing conditions, such as economic restructuring, changes in policy, unfavourable weather conditions, and the Russian crisis. Nevertheless agricultural production in the CEECs has stabilised in most countries since mid-1990. The Baltic countries, however, still seem to face a general decline of agricultural production, especially in the aftermath of the Russian crisis (see Figure 1).

Stabilisation has generally occurred in the area of crop production rather than of livestock production. Especially milk and beef production has continued to decline in the majority of CEECs. The continuous restructuring, falling income and prospects to join the EU have led to more protective policies. In recent years prices of key agricultural commodities have become closer to those of the EU. For some commodities like wheat and pork, prices are even higher in some countries. However, increasing prices have generally not resulted in increasing production and agriculture in the CEECs has not been able to use its natural potential.

In recent years especially the Russian crisis and bad weather conditions contributed to a decline of agricultural production. However, deeper underlying causes are the continuous weakening of the internal and external competitiveness of agriculture due to rapidly changing economic conditions to which agriculture was not able to adjust quickly enough.

Figure 1: The Development of Agricultural Production in the CEECs and the EU-15 (1989-91 = 100)



Source: FAO

This analysis therefore takes an explicit long-term view on the developments and incorporates additional variables characterising the economic development of labour and capital markets as well as underlying real currency trends.

2.1. Macroeconomic Assumptions

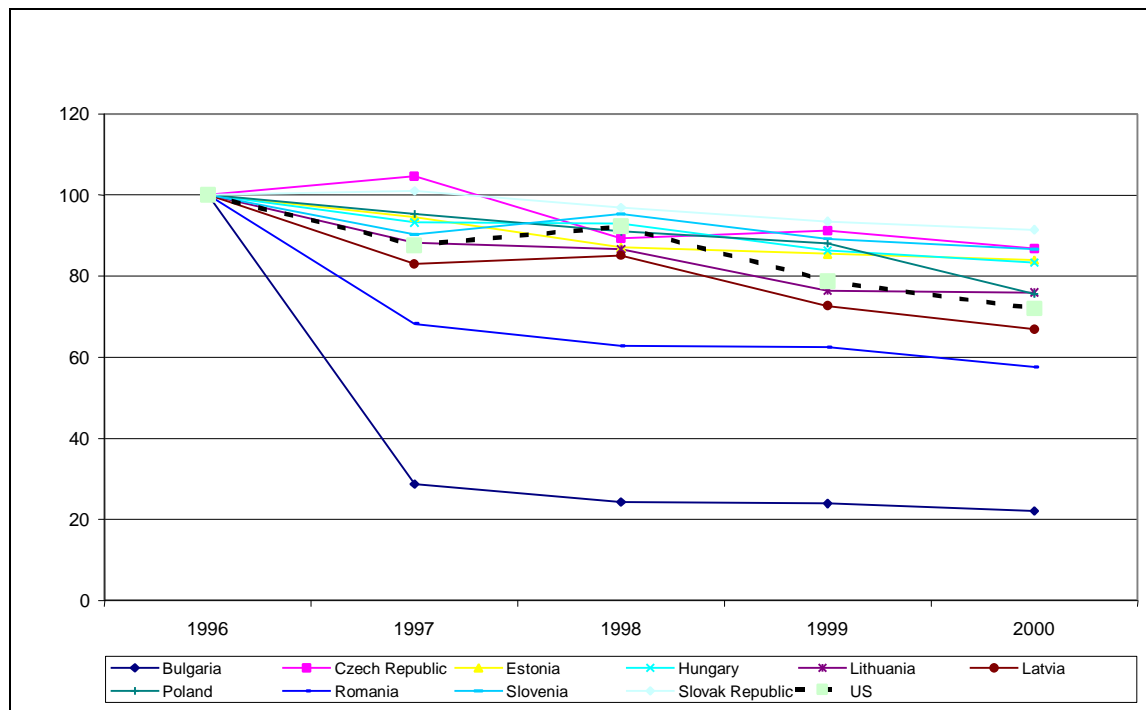
The considerable restructuring of the CEEC economies resulted in rapid economic growth in most countries. Compared to more mature market economies, key economic variables have been subject to significant changes. These economic variables, especially the development of real exchange rates, have an important impact on the competitiveness of agriculture.

In recent years the real exchange rates of CEEC currencies have appreciated considerably against major currencies, undermining the competitiveness of agriculture (see Figure 2). This has hit cattle production, which is generally labour intensive, more than crop or intensive livestock production, which are in most countries more capital intensive. One of the visible effects of these macroeconomic developments has been the continuous restructuring of livestock production.

A real appreciation of currencies changes the relative prices between tradables and non-tradables. Labour becomes more expensive while tradable agricultural products and inputs become relatively cheaper. Product prices with close links to world market prices decline in real domestic currency terms, while exchange rates only indirectly affect non-tradables. In general a real appreciation facilitates imports and makes exports more difficult unless

production technologies adjust and offset these effects. This process tends to weaken the competitiveness of low value added, labour intensive production.

Figure 2: Development of Real Exchange Rates in the CEECs and the EU-15 (1996=100)



For the needs of simulations, as far as exchange rates are concerned, the past real trends of domestic currencies against the US\$ have been assumed to continue over the medium term. For the EURO an appreciation of the real exchange rate towards parity with the US\$ has been assumed.

The other important macroeconomic assumptions are based on different sources: a) real GDP growth and the development of disposable income are based on the short term economic forecasts from the European Commission on the assumption that current GDP trends will continue in the future until 2012⁴; b) population growth is based on FAO and World Bank projections and is identical to those used in other publications of the European Commission.⁵

⁴ European Commission, Directorate-General for Economic and Financial Affairs (April 2001). Spring 2001: Economic forecasts for 2000-2002. Economic Trends.

⁵ European Commission, Directorate-General for Agriculture (2001). Prospects for Agricultural Markets 2001-2008. CAP Reports.

2.2. Policy Assumptions

The negotiations on the agricultural chapter will determine how the *acquis communautaire* will be implemented and which temporary derogations are allowed. Price and trade policies are generally not subject to the negotiation. The most politically sensitive part of agricultural negotiations is the level of production quotas and direct payments for area and cattle. According to the current regulations these have to be based on objective criteria. The determination of reference quantities, area and yields depends on the choice of a historical reference period. The EU argues for recent reference periods, referring to the better representation of agriculture unbiased by central planning and early transition and to the quality and representativity of statistics. The CEECs generally argue on the basis of their agricultural potential, which they generally see better used in the late 1980s and early 1990s than in recent years, which have been affected by bad weather conditions and declining export markets in Russia.

For the purpose of this impact assessment four different policy scenarios have been considered each of them describing a possible evolution of agricultural policies in the CEECs and the EU-15 as well as entry and integration into the single market⁶:

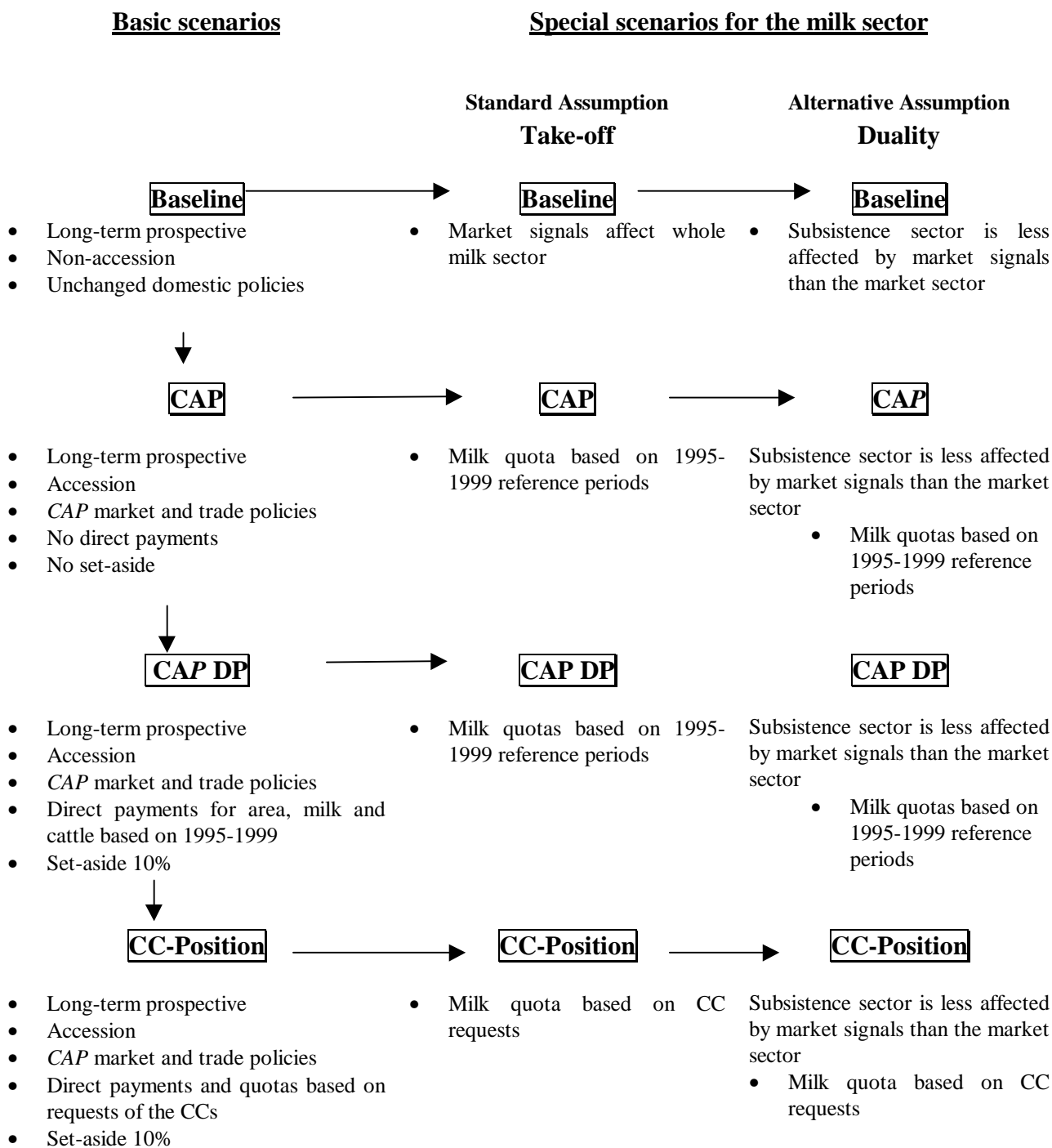
- (i) **baseline**, which assumes non accession and unchanged agricultural policies in the CEECs,
- (ii) the implementation of the CAP *without* direct payments. Production quotas are based on a recent reference period (**CAP**),
- (iii) the implementation of the CAP *with* full direct payments and quotas. Reference quantities are based on a recent reference period (**CAP DP**) and finally
- (iv) the implementation of the CAP *with* requested full direct payments and quotas. The reference quantities are based on the negotiation position of the Candidate Countries submitted up to July 2001 (**CC Position**).

The analysis also assesses some derivatives of the above scenarios for the milk sector: the *Take-off* and the *Duality* scenarios. In the *Duality* scenario, future developments have been analysed concerning the impact of enlargement on the market-oriented sector and the subsistence and semi-subsistence sector (see Figure 3).

For analytical purpose and without prejudging any possible negotiation results and possible dates of accession, the effects of the Candidate Countries integration into the EU are analysed for 2007 and 2012. The analysis also does not prejudge future Common Positions of the EU.

⁶ Non of the scenarios take the economic effects of rural development measures and structural funds on rural areas and agriculture into account.

Figure 3: Scenario Structure



The EU and the CEEC negotiation positions differ in some respects. The present analysis focuses only on market effects of introducing the CAP and on market effects related to the level of quotas, the number of premium rights for cattle and the volume of direct payments for area, which are determined by the choice of the historical reference period. A choice of a recent reference period (1995 to 1999) is compared with the request of the Candidate Countries (based rather on reference periods in the early 1990s) and effects of accession on markets of the CEECs and the EU-15 are analysed.

2.3. Selection of the Base Period for the Impact Assessment

The choice of the base period for assessing the possible development of agricultural markets under the different scenarios is particularly delicate for the CEECs. In general, a starting point should be an average or a representative year in order not to under- or overestimate long-term effects on markets. The use of a single past year as a long-term starting point seems to be problematic given the conditions in the CEECs. Frequent droughts and other unfavourable conditions greatly affect agriculture in the CEECs. Other aspects such as continuous restructuring or unfavourable market conditions like the Russian crisis contribute to the difficulty of selecting a starting point for the model analyses.

For this exercise, different base periods for the analysed markets have been chosen for each product. For **croops** and **pork** the chosen period is 1996 to 2002. This period reflects the length of a period between a down and an upturn in terms of natural conditions in the CEECs. For **beef**, **milk** and **poultry** long-term perspectives have been calibrated on the short-term forecasts for the year 2002 as produced by the Commission's services in November 2001 (DG Agriculture, 2001). The year 2002 has been chosen because either significant restructuring is ongoing in terms of downsizing production (cattle) or in terms of building up production (poultry). Quality-adjusted market and producer prices of 1999 serve as a starting point for the world, the EU and the CEECs.

3. NON-ACCESSION AND UNCHANGED DOMESTIC POLICIES (BASELINE)

The *baseline* scenario assumes that domestic policies in place in 1999 remain unchanged over the simulation period and that no Candidate Country will join the EU by 2012. Detailed results are summarised in Tables A3-1 to A3-14 in Annex 3.

Under the *baseline* scenario, **intensive livestock** production (pork, poultry) considerably expands over the period in question, because it is favoured by relatively low prices of feed grains compared to producer prices of livestock. Net exports of pork and poultry stay constant, which results in turn in constantly increasing prices once demand grows. These favourable developments of producer prices lead to production increases between 17% and 22% over the simulation period.

Cereal production in the *baseline* increases from 75 Mill. t in the base period to 86.8 Mill. t. in 2012. As a result of increasing pork and poultry production of pork and poultry, feed grain use increases by 5.9 Mill. t from 44.4 Mill. t in the base period to 50.3 Mill. t in 2012. Most of the increase is accounted for by wheat and maize, while the use of **rye**, **oats** and **triticale** stagnates at approximately 11 Mill. t. Feed use in the CEECs develops in *baseline* to a more feed grain based system and less protein is used from sources such

as oilseed meals and other protein rich feeds. This indicates lower protein use in the feed ratios. The CEECs use significantly more feed to produce one tonne of meat than in the EU. This observation of low feeding efficiency is consistent with past development (Pouliquen 2001).

The marketable surplus⁷ of cereals develops due to the summarised supply and use trends. Until 2007 cereal production increases more rapidly than domestic use, although feed use expands. As a result market surpluses of cereal increase from 3.20 Mill. t in the base period to 9.45 Mill. t in 2007. In the following years these market surpluses slightly decline to 8.7 Mill. t in 2012 as domestic use, especially feed demand, picks up.

Barley deficits grow to 1.3 Mill. t in 2012, mainly due to increasing feed demand in the CEECs. On the other hand maize exports slightly increase over the simulation period and stabilise in 2012 at levels of 2.9 Mill. t. Current agricultural policies in the CEECs would lead to growing market surpluses of rye of 1.4 Mill. t in 2007 from a slight deficit on 0.36 Mill. t in the base period. Higher amounts of export refunds for rye would be necessary to stabilise domestic markets in the CEECs.

Cattle production, on the other hand, declines over the period in question. The macroeconomic conditions weaken the competitiveness of labour intensive cattle production relative to crops and grain-fed livestock. **Milk** production in the CEECs declines from 27.8 Mill. t in the base period to 23.25 Mill. t in 2012. This continuous downward trend illustrates the need for market-oriented agriculture to restructure sufficiently to become competitive in the medium to long run. The analysis assumes that milk production as a whole is affected by market signals. The high share of subsistence agriculture in some CEECs might actually stabilise production but also slows down restructuring and efficient use of the agricultural potential.

Due to the cost structure of milk production some CEECs experience a higher economic pressure than others to keep up production. By 2012 Romania, for example, reduces milk production by 27%, while Poland's milk production declines by 17% and that of the Czech Republic by approximately 10%. A stabilisation of production at current levels would require increased investments, restructuring and/or increased support levels.

The decline of milk production also affects the amount of milk processed into butter, milk powder and cheese. Combined with expanding production of fresh milk products, less butter and milk powder as well as cheese are produced.

With regards to dairy products, the demand for **cheese** and **fresh milk products** benefits most from the increase of consumer incomes. Consumption increases by approximately 23% over the period in question. At the same time, consumption of **butter** stagnates. For dairy products the CEECs become net importers of cheese and later also of butter, because declining production cannot meet increasing demand.

Closely linked to the production of milk is the production of **beef**, because the majority of calves are born in the dairy herds and the specialised beef production has still an almost negligible size in the CEECs. Due to this close link, production of beef declines from

⁷ Marketable surplus and market deficit are defined as the difference between production and total domestic use.

1 Mill. t to 0.85 Mill. t in 2012. This is in general consistent with expectations in the literature and similar to the trends observed in recent years.

The analysis suggests that agriculture in the CEECs under domestic policies is able to moderately expand in the long run. The market surpluses of cereals expand until 2007 and then stagnate. The example of grain fed livestock production shows that in sectors where prices increase production is able to expand. The situation for beef and milk production seems to be less positive. The main underlying factor in the CEECs relates to macroeconomic conditions, in particular the appreciation of the real exchange rate and labour costs, which weaken the internal competitiveness of agriculture. The labour intensive, low value added part of agriculture, in particular, is not able to adjust quickly enough to offset these pressures.

4. DEVELOPMENTS IN AGRICULTURAL MARKETS IN THE ACCESSION SCENARIOS

This section analyses the market effects of different accession scenarios. As already mentioned before, the main differences among the accession scenarios are the reference periods for direct payments and supply control instruments. The market effects of the three accession scenarios *CAP*, *CAP DP*, and *CC Position* are analysed.

The market effects for cereals and oilseeds as well as for milk, beef, pork and poultry are investigated. The analysis is pursued for the CEECs as a group as well as for the individual CEECs. The probable market effects of introducing different levels of direct payments for area and set-aside into the CEECs are analysed in depth.

4.1. Pork and Poultry Markets in the CEECs

Compared to the baseline, production of pork in the CEECs generally loses competitiveness under CAP and single market conditions. Pork prices are considerably lower on the single market than under CEEC policies. Moreover, feed costs increase as prices for coarse grains increase during accession. This development impacts on some of the big producing countries such as Poland, Hungary and Romania. Pouliquen (2001) shows that feed use is generally very inefficient compared to the EU, i.e. more feed is used to produce the same quantity of meat than under EU conditions. As a response to the cost and price pressures, feed use gains efficiency compared to the situation under domestic policies.

Figure 3: Pork Markets in the CEECs under different Scenarios (Mill. t)

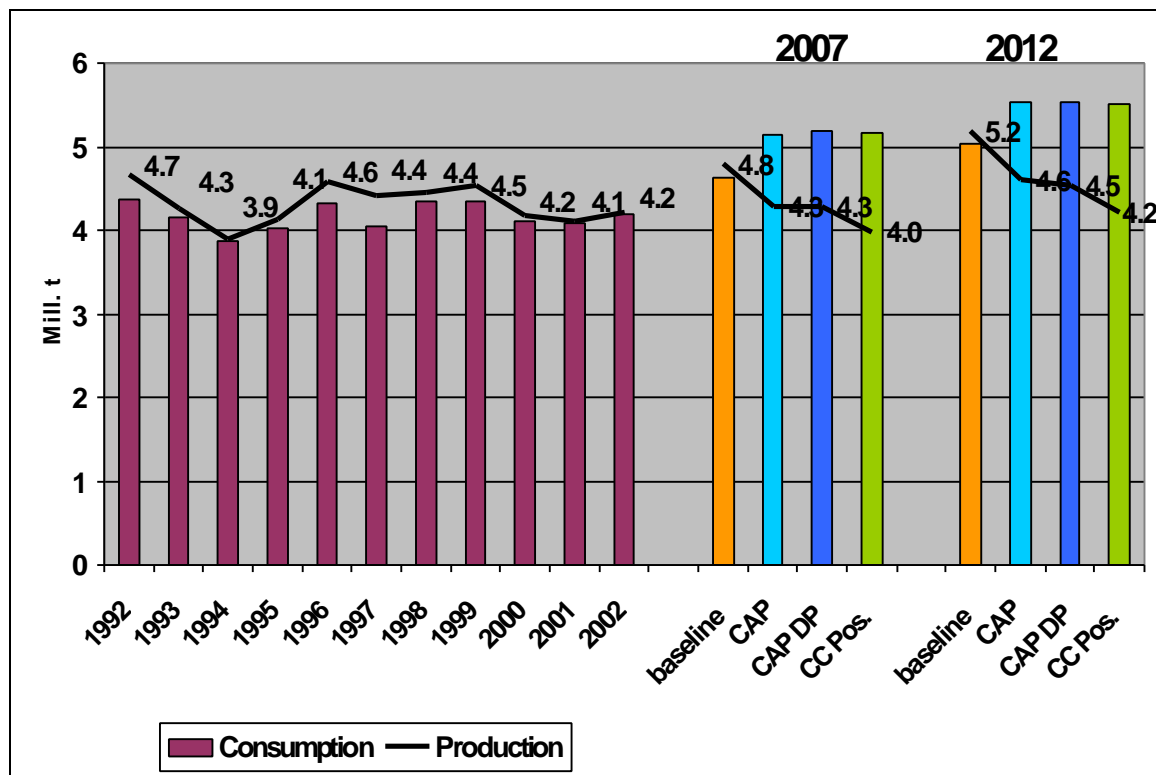
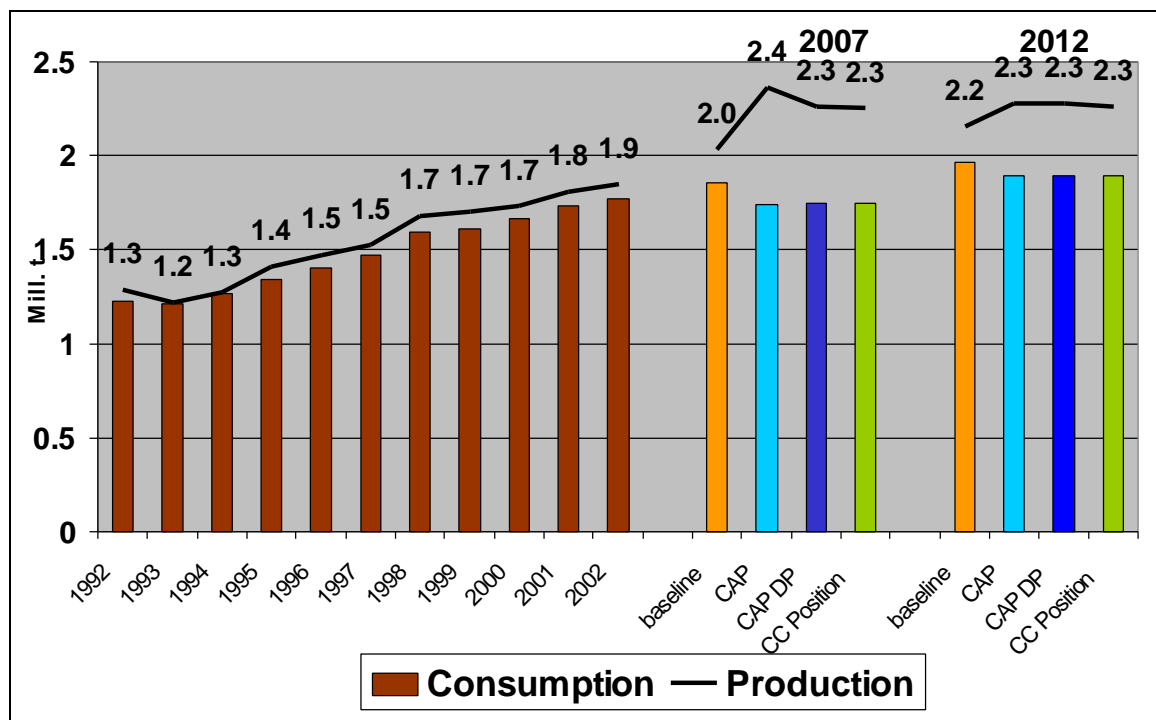


Figure 4: Development of Poultry Markets in the CEECs under different Scenarios (Mill. t)



Production of **pork** is between 0.7 to 1 Mill. t lower in the accession scenarios than under domestic policies (see Figure 3). At the same time domestic consumption is higher, such that the CEECs become net importers of 0.86 and 1.19 Mill. t in 2007, depending on the accession scenario. After the initial drop and restructuring following accession, production of pork increases again over time.

Poultry production on the other hand is positively affected by accession and is between 200,000 t to 300,000 t higher than in the *baseline*. It remains however stagnant until 2012 (see Figure 4). Poultry production is better adapted to competition in the single market than pork production, mainly because prices are more competitive in most CEECs compared to the EU and feed use is more efficient for poultry than for pork. Despite the initial expansion, poultry production is not able to further expand, i.e. is less able to adapt to the competitive pressure on the single market than the restructured pork production.

The simulations indicate that the intensive livestock sector requires substantial restructuring with respect to production technologies. Large investments are required to increase competitiveness especially in the mostly family-farm-based pork sector.

4.2. Cereal and Oilseed Production in the CEECs

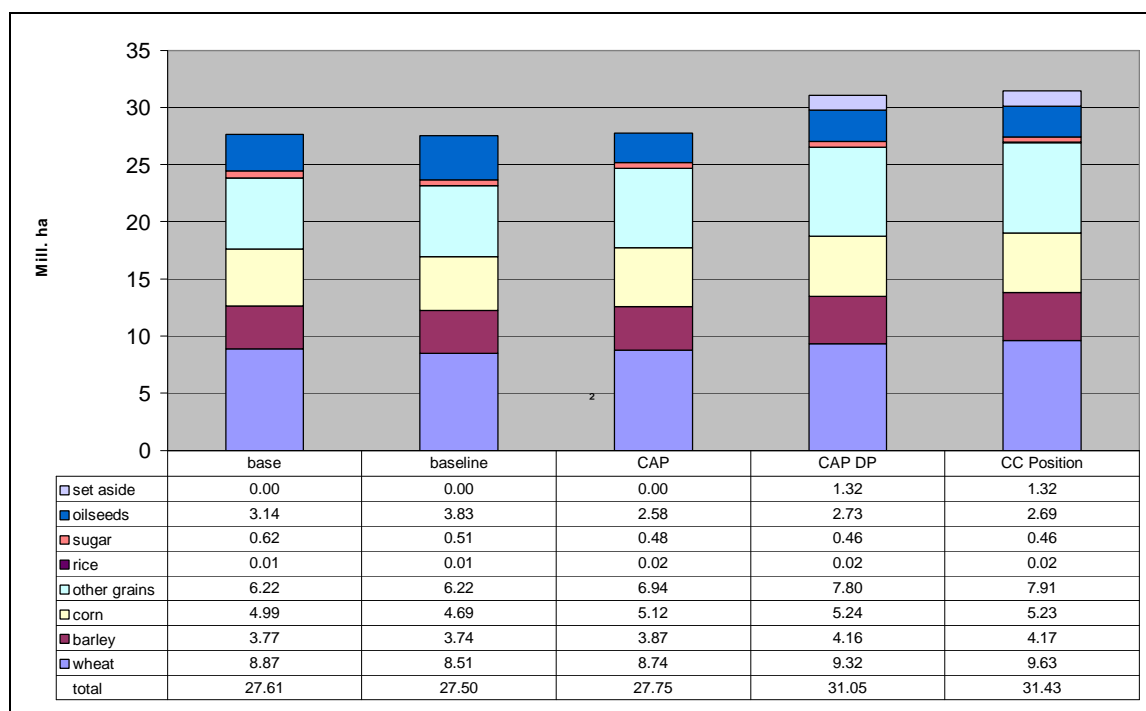
This chapter examines the main results of the accession scenarios in the area of cereals and oilseed production. In a second part the results are displayed in more detail for the effects that different CAP instruments have on marketable surplus in the CEECs.

4.2.1. Overview of the Main Results for Production

In the *baseline* scenario, cereal production expands from 75 Mill. t in the base period to 83 Mill. t in 2007 and to 87 Mill. t in 2012. At the same time oilseed production increases from 4.42 Mill. t in the base period to 5.77 Mill. t in 2012. This slight increase in cereal and oilseed production is mainly due to gains in productivity. In that period prices for oilseeds develop more favourably compared to cereals such that oilseed area expands at the expense of coarse grain area by approximately 0.7 Mill. ha (see Figure 5).

In the accession scenarios the CAP changes relative prices within cereals as well as between cereals and oilseeds. Coarse grain prices benefit from accession, and generally increase (rye, maize), while wheat and oilseed prices remain stagnant. Changing relative prices and profitability affects the use of area for different crops.

Figure 5: Structure of Area Use in the CEECs under different Policy Scenarios in the base period and 2012 (Mill. ha)



In *CAP*, i.e. accession without direct payments, oilseed area falls below the level of the base period to 2.5 Mill. ha. At the same time cereals area increases driven by the relative prices (especially coarse grain prices). Since no set-aside is applied, the total area of 27 Mill. ha is largely unaffected. In 2007 production of cereals is approximately 12 Mill. t higher than in *baseline*, of which are approximately 4 Mill. t wheat and maize, 3.5 Mill. t rye, and 0.7 Mill. t barley. At the same time production of oilseeds declines by 1.5 Mill. t and imports increase (see Figures 6, 7 and 8).

In the two scenarios in which farmers become eligible for full direct payments fixed on the reference period of 1995-1999 (*CAP DP*) or on the Candidate Countries' positions (*CC Position*), two effects are visible. Firstly, arable area allocated to crops increases by 3.7 Mill. ha in *CAP DP* and by 3.9 Mill. ha in *CC Position*. In addition the distribution of area between crops changes compared to the scenario without direct payments (see Figure 5).

Due to the special situation caused by transition, the introduction of full direct payments in the CEECs leads to an initial shock, which affects the allocation of area and attracts additional area for cereals and oilseeds. During transition a considerable amount of area was shifted to fodder and pasture area and to fallow land. Fodder and pasture area expanded by 4.5 Mill. ha from 9 Mill. ha in 1987 to 13.5 Mill. ha in 2000, despite a substantial reduction of cattle (and sheep) numbers of approximately 49%. The amount of fallow land expanded and can be estimated to be around 2 Mill. ha. Additionally a relatively large part of the area (compared to the EU-15) is used for producing low value added crops like feed potatoes. The additional land potentially available for cereal and oilseed production could be approximately 6.5 to 7.5 Mill. ha. This land reserve may be even larger, if part of the permanent grassland is of a quality to justify a conversion into arable area. The land reserve is quite different between countries. Hungary, for example, is not able to increase area by much, while Poland as a country with a comparably large land reserve, expands area but is not able to fully convert it.

Figure 6: Development of Cereal Markets in the CEECs in Different Scenarios (Mill. t)

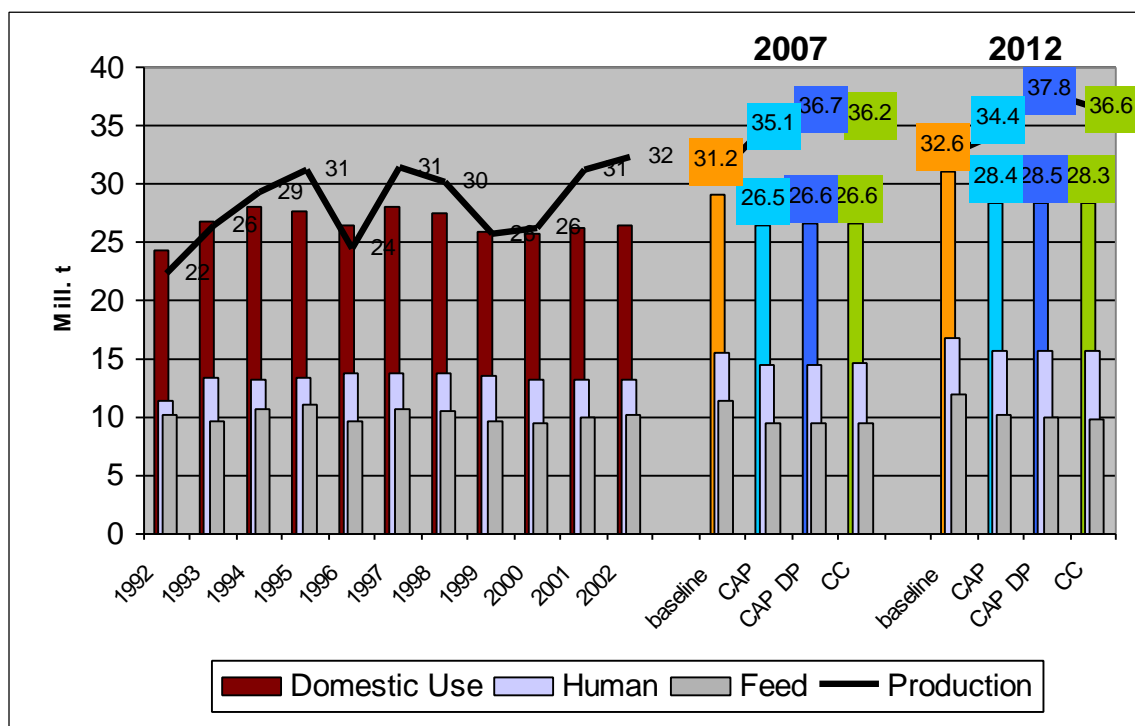


Figure 7: Development of Rye Markets in the CEECs under different Scenarios (Mill. t)

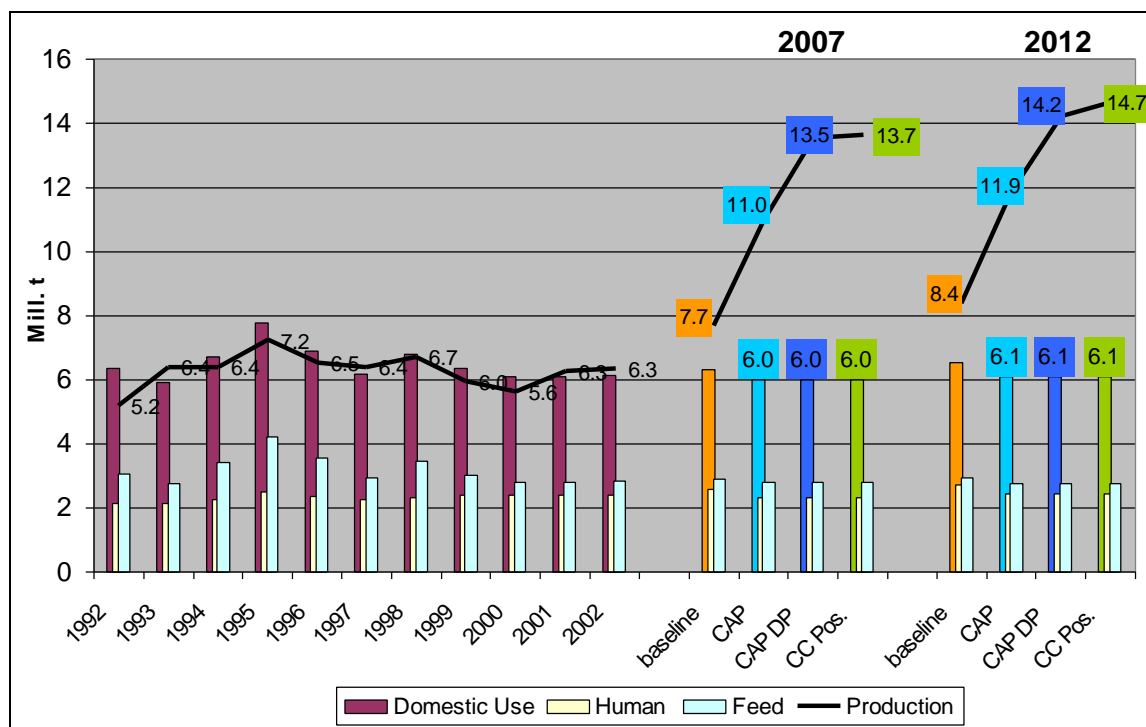
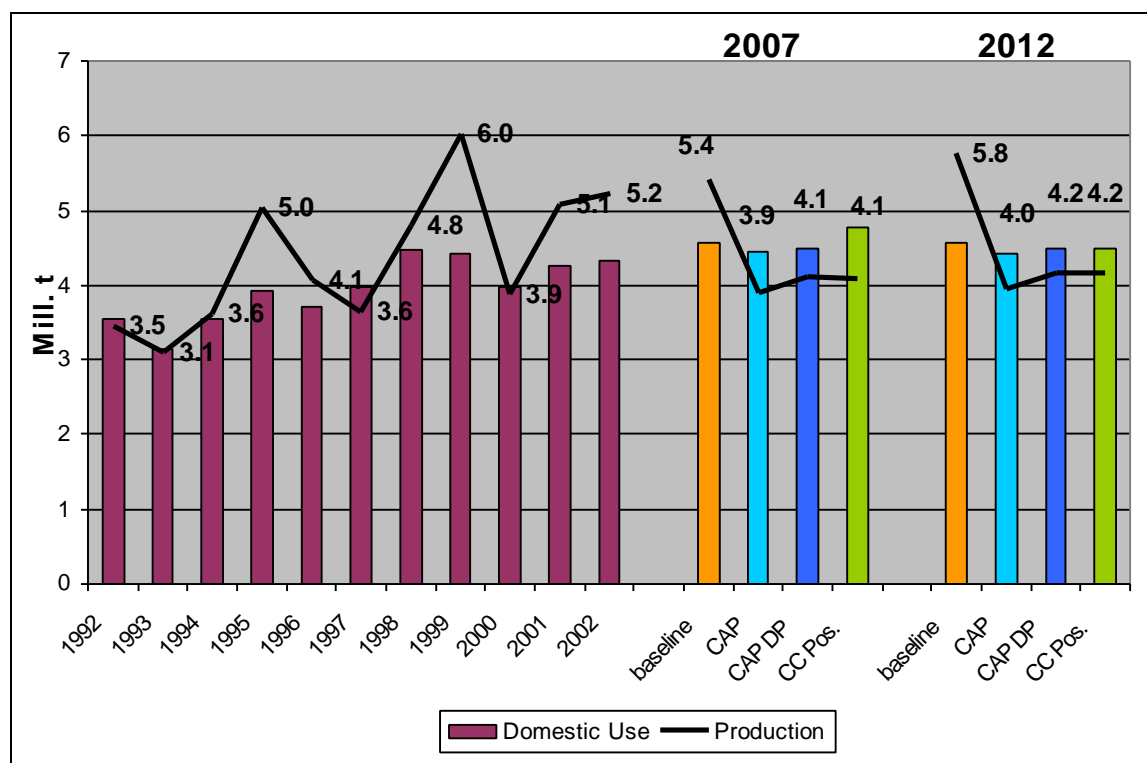


Figure 8: Oilseed Markets in the CEECs under different Scenarios (Mill. t)



Coarse grains mainly benefit and increase area from the effect of changes in area use among arable crops, while area under wheat shows only little increase. At the same time set-aside reduces total arable area by 1.32 Mill. ha. As a result of the introduction of direct payments for area, production of cereals in the CEECs is approximately 5 Mill. t in 2007 and 7 Mill. t in 2012 higher than in the simulations without direct payments.

The effects of direct payments on area use could be expected to be different in the EU-15 and in the Candidate Countries. The use of base area in the EU is relatively stable. The main reasons for this are agronomic ones, which prevent a significant increase of cereal and oilseed production, and economic ones because area payments help to maintain the status quo in terms of relative profitability of crops, as they were designed to compensate or partly compensate for the price cuts in the last two reforms.

Direct payments increase the attractiveness of cereals and oilseed in relation to other crops like potatoes and even attract previous fallow land into production. This happens despite the fact that hectare payments are reduced according to the overshoot of the country specific base area. Compared to *CAP* the overall expansion is approximately 3.7 Mill. ha and 3.9 Mill. ha, in *CAP DP* and *CC Position*, respectively. On the other hand the assumed reference rate for set-aside of 10% reduces the area by 1.2 Mill. ha and 1.3 Mill. ha, respectively.⁸

The higher the direct payments (because of larger base area and higher base yields) in the scenarios, the more favourable the production of oilseeds and coarse grains, especially for

⁸ The low rate of effective set aside is explained by the large share of small producers in countries like Poland, Romania and Hungary, in which small producer farm between 60 and 75 percent of the arable area.

the relatively low competitiveness crops. Higher direct payments in *CC Position* expand the oilseed area and the area for rye. In general, direct payments appear to favour those cereals, which otherwise would be less competitive. High direct payments even divert some area away from sugar beet production. This happens, however, only in the Baltic countries where comparably poor cost structures combine with adverse natural conditions for sugar beet production.

Direct payments in *CAP DP*, which are assumed to be fixed on the basis of 1995 to 1999 averages for area use and yields, cause the inflow of more area to crops, despite set-aside of nominally 10%. Production of cereals is approximately 4.8 Mill. t higher than *in CAP* without direct payments. Most of that increase materialises in rye and in wheat (see Figure 7). In 2012 cereal production is approximately 0.9 Mill. t higher in *CC Position* than under *CAP DP* with full direct payments. More than half of the additional cereal production is rye.

The simulations apply the CAP obligation that in case of an overshoot of base area, hectare premiums are proportionally decreased. This mechanism is designed to keep the volumes of payments constant for a given country or region. The simulation suggests that the differences of volumes of payments between *CAP DP* and *CC Position* have only a relatively small impact on overall surpluses but a greater influence on surpluses for particular crops.

Oilseed production is slightly higher in the scenarios with direct payments than in a situation without direct payments. Higher volumes of direct payments in *CC Position* are unlikely to increase crop area much more. However, oilseed area, especially of low yielding sunflower seed, increases.

The **feed use** of cereals in the CEEC-10 changes considerably in the accession scenarios due to the decline of pork production and the stagnation of poultry production. Compared to *baseline*, cereal use is between 7 and 9 Mill. t lower in the accession scenarios in 2007. Due to increasing coarse grain prices in the CEECs the feed conversion rate adjusts slightly downwards from levels of 6.2 tonne of cereals per tonne of meat produced to 5.5 tonnes. The equivalent in the EU-15 remains stable at approximately 3.5 tonnes per tonne of meat produced. This efficiency gap shows the significant differences in feeding habits and feeding efficiency in the EU-15 and the CEEC-10.

Depending on the scenario the use of oilseed meals in the CEECs increases by 32% to 36%, that of other protein rich feeds by approximately 17%. Also alternative energy sources are used slightly more. Less efficient feed use is a main factor for the less competitive intensive livestock production in the CEECs compared to the EU-15. However, adjustments due to price and cost pressures are visible in the CEECs: cereal use declines and the use of protein rich feeds increases. These developments particularly affect the feed use for pork but to a lesser extent also that for poultry and eggs.

Table 1: Development of Cereal Feed Conversion Rates in EU and CEECs in different Scenarios.

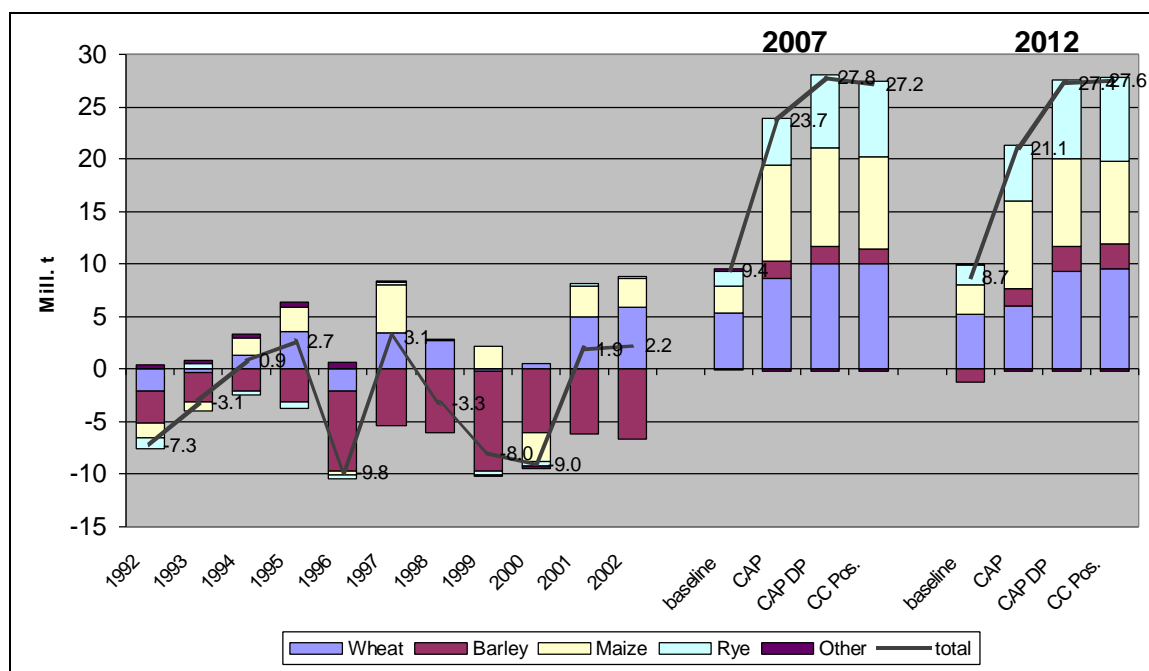
	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
meat production EU-15 (Mill. t)*	32.75	35.43	36.58	36.61	36.91	36.49	37.97	38.01	38.30
meat production CEEC-10 (Mill. t)*	7.44	8.25	7.41	7.31	6.97	8.10	7.66	7.62	7.26
feed cereal use EU-15 (Mill. t)	118.80	126.83	132.38	132.81	133.10	127.18	132.68	133.33	133.64
feed cereal use CEEC-10 (Mill. t)	44.42	47.81	40.60	40.89	41.66	50.25	41.81	41.91	42.56
cereal use per ton of meat production EU-15	3.63	3.58	3.62	3.63	3.61	3.49	3.49	3.51	3.49
cereal use per ton of meat production CEEC-10	5.97	5.80	5.48	5.59	5.98	6.20	5.46	5.50	5.86

* pork, poultry, eggs

In the *baseline* scenario the development of cereal market surpluses is very modest at levels of around 8 to 9 Mill. t, because of a strong demand for feed grains and a modest development of production. The market surpluses in *baseline* consist of wheat and maize, which are not difficult to sell on international or domestic markets. It appears, however, that under current CEEC policies a problem with rye emerges consisting of 1.4 Mill. t of marketable surpluses in 2007.

On accession market surpluses are larger because production expands more than domestic use. Especially feed demand declines relative to the situation with unchanged domestic policies (*baseline*). The CEECs market surplus expands for all major cereals with the biggest relative expansion for rye and maize (see Figure 9). In 2007 rye surpluses expand from a moderate 1.4 Mill. t in *baseline* to 4.42 Mill. t in *CAP* and further with direct payments to approximately 7 Mill. t. Such a development could pose serious problems for the CAP. Maize surpluses develop from 2.58 Mill. t in *baseline* to 8.8 Mill. t to 9.2 Mill. t in 2007 in the accession scenarios. For wheat, surpluses in the accession scenarios are approximately 3 to 4.6 Mill. t higher than under *baseline* conditions. Barley surpluses increase only moderately from a deficit under *baseline* to 1.6 Mill. t under accession conditions. The overall cereal surplus increases from 9.45 Mill. t in 2007 under *baseline* to 23.6 Mill. t in *CAP* to 27.81 Mill. t under *CAP DP*.

Figure 9: Development of Cereal Market surpluses in the CEECs under different Scenarios (Mill. t)



4.2.2. The Impact of Direct Payments and Set-aside on Exportable Market Surpluses in the CEECs

This section analyses the market effects of the instruments applied to the arable crop sector, in particular the effects of direct payments on market surpluses in the CEECs. For this purpose different effects have been identified and displayed in the tables: production effects related to yields, changes of total cereal and oilseed area, impact of set-aside and the effects of changes of area distribution. On the demand side the effects are separated into feed and other uses, the latter comprising human and industrial demand as well as seed demand changes.

The analyses compare the effects of intensification (yield effects), changes in capacities of production (total crop and oilseed area effect) and the effect of distribution changes in area due to the changes in relative prices. On the demand side the feed-use effect relates to the composition as well as the level of feed use changes in relation to the level of livestock production and its composition as well as in relation to the relative price changes of feeds for the individual livestock products. The use side also includes effects related to human and industrial demand.

For each of the major instruments of the CAP and its variations in the different scenarios, marketable surplus quantities are identified: firstly, for the effect of CAP prices, secondly, for the effect of direct payments and set-aside under the *CAP DP* and, thirdly, for the additional effects of higher claims for direct payments and area in the *CC Position*.

Step 1: The Effect of CAP prices

In a first step the effect of CAP prices are analysed in Table 2. It shows the market surplus effects of applying the CAP without direct payments to the Candidate Countries in 2012. The table starts with market surplus already visible in the *baseline*, which is the reference for this comparison. In 2012 the cereal market surplus in *baseline* is 8.68 Mill. t. The market surplus in CAP is 21.09 Mill. t. The difference of 12.4 Mill. t is attributed to the different effects on the production and on the consumption side (Table 2).

Table 2: The Price Effects of Accession on Market Surpluses in the CEECs without Direct Payments (baseline vs. CAP) (Mill. t)

	Surplus	Production Effects					Decline of Domestic Use			Surplus
	baseline	total	yields	add. Area	set aside	distribution of area	total	feed	other	Agenda 2000
	A	B=C+D+E+F	C	D	E	F	G=H+I	H	I	J=A+B+G
cereals	8.68	5.78	3.71	0.80	0.00	1.28	6.63	7.74	-1.11	21.10
wheat	5.16	-1.23	0.82	0.30	0.00	-2.35	2.06	1.85	0.20	5.99
coarse grains	3.52	7.01	2.88	0.50	0.00	3.63	4.57	5.89	-1.32	15.11
barley	-1.30	0.79	0.45	0.11	0.00	0.23	2.25	2.76	-0.52	1.73
maize	2.86	2.97	1.36	0.21	0.00	1.40	2.51	2.46	0.05	8.34
other	1.97	3.25	1.07	0.18	0.00	2.00	-0.18	0.67	-0.85	5.04
oilseeds	1.21	-1.81	0.18	0.03	0.00	-2.03	0.13		0.13	-0.48

Positive non-bold number: contribution to the market surplus; *negative non-bold number*: removing market surplus.

The production effect on market surpluses is 5.78 Mill. t in total from which 3.7 Mill. t is related to intensifying production (higher yields) under CAP conditions. Additional area accounts for 0.80 Mill. t market surplus. Set-aside is not applied. However, the biggest part of the market surplus effect on production results from the change of distribution of area use. More area is allocated to cereals and in particular to coarse grains at the expense of oilseeds. This adds 1.28 Mill. t to the cereal market surplus and removes 2.03 Mill. t from the oilseed market surplus.

The decline of domestic use accounts for an additional 6.63 Mill. t of cereal market surplus, most of that is related to the decline of feed use and of human demand for coarse grains. Relative prices in CAP favour the production of coarse grain at the expense of wheat and oilseeds. Especially higher rye and maize production contributes to the increasing surpluses on production (3.25 Mill. t and 2.97 Mill. t, respectively) and on the feed use side, while production effects for wheat are negative. In conclusion, CAP prices affect the structure of production of cereals - some of which are confronted with stagnant market - and oilseeds.

Step 2: The Effect of Direct Payments and Set-aside

The next step analyses the effects of direct payments and set-aside by comparing the CAP DP with CAP. In 2012 the market surplus in CAP is 21.09 Mill. t compared to 27.36 Mill. t in CAP DP. In the latter scenario farmers in the CEECs become fully entitled to direct payments. The difference of 6.26 Mill. t is again attributed to the different effects on the production and consumption side (see Table 3).

The total production effect is 6.7 Mill. t of additional market surpluses for cereals. The biggest factor contributing on the production side is additional area attracted to arable crops by direct payments. This effect accounts for 10.91 Mill. t of cereals. The biggest

offsetting effect is the 10% set-aside requirement, which is able to remove 4.45 Mill. t from the market surpluses, mostly from wheat.

Table 3: The Effects of Direct Payments and Set-aside in CAP DP on the Marketable Market surplus in the CEECs (Mill. t)

	Surplus	Production					Domestic Use			Surplus
	Agenda 2000	total	yields	ad. Area	set aside	distribution of area	total	feed	other	Agenda 2000 DP
	A	B=C+D+E+F	C	D	E	F	G=H+I	H	I	J=A+B+G
cereals	21.10	6.70	-0.36	10.91	-4.45	0.59	-0.44	-0.10	-0.35	27.36
wheat	5.99	3.41	-0.22	4.16	-1.69	1.16	-0.03	0.15	-0.17	9.37
coarse grains	15.11	3.29	-0.14	6.75	-2.75	-0.56	-0.42	-0.24	-0.17	17.99
barley	1.73	0.73	-0.05	1.49	-0.61	-0.10	-0.10	-0.06	-0.04	2.36
corn	8.34	0.10	-0.13	2.70	-1.11	-1.36	-0.20	-0.19	-0.01	8.24
other	5.04	2.46	0.04	2.56	-1.04	0.90	-0.11	0.01	-0.12	7.39
oilseeds	-0.48	0.20	0.02	0.46	-0.19	-0.09	-0.06	0.00	-0.06	-0.34

Positive non-bold number: contribution to the market surplus; *negative non-bold number:* removing market surplus.

The analysis shows that direct payments attract additional area in the CEECs. Direct payments favour the production of those cereals which have limited markets within the EU as well as in the CEECs, i.e. rye and partly also barley. The additional surpluses of wheat and maize are less problematic.

Direct payments contribute positively to the production of oilseeds. The positive effect on production is 0.2 Mill. t. However, the composition of oilseed production changes in response to the direct payments. Set-aside removes 0.19 Mill. t from the market surplus. Crushing demand in the CEECs consumes additional 0.06 Mill. t compared to the scenario without direct payments. As a result net imports in the CEECs decline by 140,000 t due to direct payments.

Step 3: The Effects of the CC Positions on Market surpluses

The negotiation positions of the Candidate Countries vary from that of the EU in many areas. The relevant parts for this analysis are the difference in claims for the level of direct payments (base area and reference yields).

Comparing the effect of additional direct payments compared to those given in *CAP DP* shows no major further shift in volume of surpluses (+0.21 Mill. t), however, the higher volume of direct payments in the CEECs provokes further surpluses for other grains, which is mainly rye, and maize. The latter is less problematic because domestic use in the CEECs absorbs more than the additional production between the two scenarios, while additional rye surpluses add to the already difficult market situation. The results suggest that the additional volumes of payments create more problems in those markets, which are already in a difficult situation.

Table 4: The Effects of Additional Direct Payments and Quotas Requested in the CC Positions compared to those in the CAP DP (Mill. t)

Agenda 2000 DP	Surplus	Production					Decline of Domestic Use			Surplus
	A	total	yields	add. Area	set aside	distribution of area	total	feed	other	CC Position J=A+B+G
		B=C+D+E+F	C	D	E	F	G=H+I	H	I	
cereals	27.36	0.91	0.48	0.86	-0.04	-0.38	-0.70	-0.66	-0.04	27.57
wheat	9.37	0.15	0.13	0.30	-0.01	-0.28	0.06	0.07	-0.01	9.58
coarse grains	17.99	0.76	0.34	0.56	-0.04	-0.10	-0.76	-0.73	-0.03	17.99
barley	2.36	0.08	0.04	0.11	0.00	-0.06	-0.14	-0.14	0.00	2.30
corn	8.24	0.22	0.27	0.23	-0.02	-0.26	-0.58	-0.58	0.00	7.88
other	7.39	0.46	0.03	0.22	-0.02	0.22	-0.04	-0.01	-0.02	7.81
oilseeds	-0.34	1.61	0.01	0.03	0.00	1.57	-1.61		-1.61	-0.33

Positive non-bold number: contribution to the market surplus; *negative non-bold number*: removing market surplus.

Concluding Remarks

In the scenarios with full direct payments, cereals and oilseeds attract additional area from the land reserve. The simulation results show, however, that direct payments for area triggers considerably less additional area than the available land reserve of 6.5 to 7.5 Mill. ha. Compared to *CAP* the overall gross expansion is approximately 3.7 Mill. ha and 3.9 Mill. ha, in *CAP DP* and *CC Position*, respectively. Set-aside, as a supply-limiting tool with an assumed reference rate of 10%, is projected to reduce the area by 1.2 Mill. ha and 1.3 Mill. ha, respectively⁹. The net effect of introducing full direct payments therefore is 2.5 Mill. ha and 2.6 Mill. ha, respectively.

The mobilisation of less than the theoretical available additional area is due to two main reasons: (i) firstly of all the level of direct payments per hectare could mobilise only a part of the potential land reserve; (ii) because the base areas are established upon historical references, additional area would lead to an overshoot which would be penalised by a reduction of direct payments per hectare.

A higher volume of direct payments due to higher references (base area and base yields) in *CC Position* have only a limited effect on the expansion of cereal and oilseed area. In general, direct payments appear to favour those cereals, which otherwise would be less competitive. High volumes of direct payments even could divert some area away from sugar beet production. This is projected to take place, however, only in the Baltic countries where comparably poor cost structures combine with adverse natural conditions for sugar beet production.

In 2007 the granting of full direct payments would increase production of cereals in the CEECs to approximately 5 Mill. t more than the implementation of *CAP* without direct payments. Most of that increase would materialise in rye and in wheat. Higher cereal prices on the other hand would increase production by 8.8 Mill. t. These results indicate that despite the very specific situation in the CEECs, the introduction of full direct payments would have a significantly lower effect on production than the price effect.

For the production side, the main question arises as to whether farmers in the CEECs would allocate more area to the production of arable crops when receiving higher volumes of direct payment compared to the volumes under *CAP DP*. The results suggest that the expansion of area is relatively modest and the relative attractiveness of eligible products is

⁹ The low rate of effective set aside is explained by the large share of small producers in countries like Poland, Romania and Hungary, in which small producers farm between 60 and 75 percent of the arable area.

only marginally affected. This allows for the conclusion that direct payments already affect the relative attractiveness of production of eligible crops even when given in significantly lower volumes than assumed in *CAP DP*, e.g. at 30% of that volume.

Set-aside as a supply management tool is only able to remove a limited amount of market surplus compared to those created by additional total area. Since the more problematic market surpluses of cereals come from countries with a high share of small producers, effects of set-aside for those commodities are limited. In these countries the effects of additional area attracted by direct payments are even less offset than the average would suggest. This relates primarily to rye in the Baltic countries and Poland.

4.3. Beef, Milk and Dairy Production in the CEECs

Compared to the generally positive development of crop production, a mixed picture emerges for livestock production. The *baseline* scenario indicates that without deep restructuring, economic developments will further undermine the internal competitiveness of milk and beef production. In *baseline* beef production adjusts downwards from 1.08 in the base period to 0.81 Mill. t in 2012. In the same period milk production declines by 4.4 Mill. t from 27.81 Mill. t in the base period to 23.49 Mill. t.

Traditionally beef and dairy production in the CEECs are closely linked. Beef generally is a by-product of milk production in terms of calves for fattening as well as in terms of meat produced. The pure beef herds, though slightly increasing over the last years, still represent only a small part of the beef production in the CEECs.

One characteristic of the Candidate Countries is semi-subsistence farming, which includes small-scale farming oriented to own consumption and limited direct sales. This feature of farming is a phenomenon in most CEECs and of considerable importance for Poland, Bulgaria, Romania and some Baltic countries. For these households, agricultural commodities produced for own consumption represent an essential part of incomes. Other income sources are often social benefits, contributions from the wider family and limited direct sales to fellow villagers. These farms coexists with market-oriented farms and compete for resources (land, capital). This characteristic is often referred as duality of agriculture. Pouliquen (2001) provides a more detailed analysis.

The special characteristics of milk production as a highly perishable produce with – under EU conditions – high requirements for production standards and hygiene conditions, highlights the duality problem more than in other sectors in agriculture. Market-oriented farms already successful under current conditions in the CEECs would find the necessary means to respond to the incentives of the CAP and the single market. The non-market sector comprising of subsistence and semi-subsistence, however, would have to make relatively high investments in machinery and often also into human capital in order to react to market forces and more importantly also to implement the high hygiene and veterinary standards of milk under EU standards. The risk remains that, like in the past, this part of agriculture could remain static focusing on own consumption and limited direct sales of low quality milk on a semi-legal basis.

In the light of programmes undertaken by the CC governments and the EU aimed at fostering restructuring, two scenarios have been considered:

(i) a *take-off* of the whole milk and beef sector. This scenario assumes massive restructuring and reorientation of producers in the semi-subsistence sector. – and

(ii) a *duality* scenario, i.e. a more or less static behaviour of the semi-subsistence sector, implying that only the market-oriented sector responds to market signals (see Figure 3).

Both scenarios assumes that *quotas* are based on 1995 to 1999 reference period in *CAP* as well as *CAP DP* and on the claims in the positions of the Candidate Countries (*CC Position*).

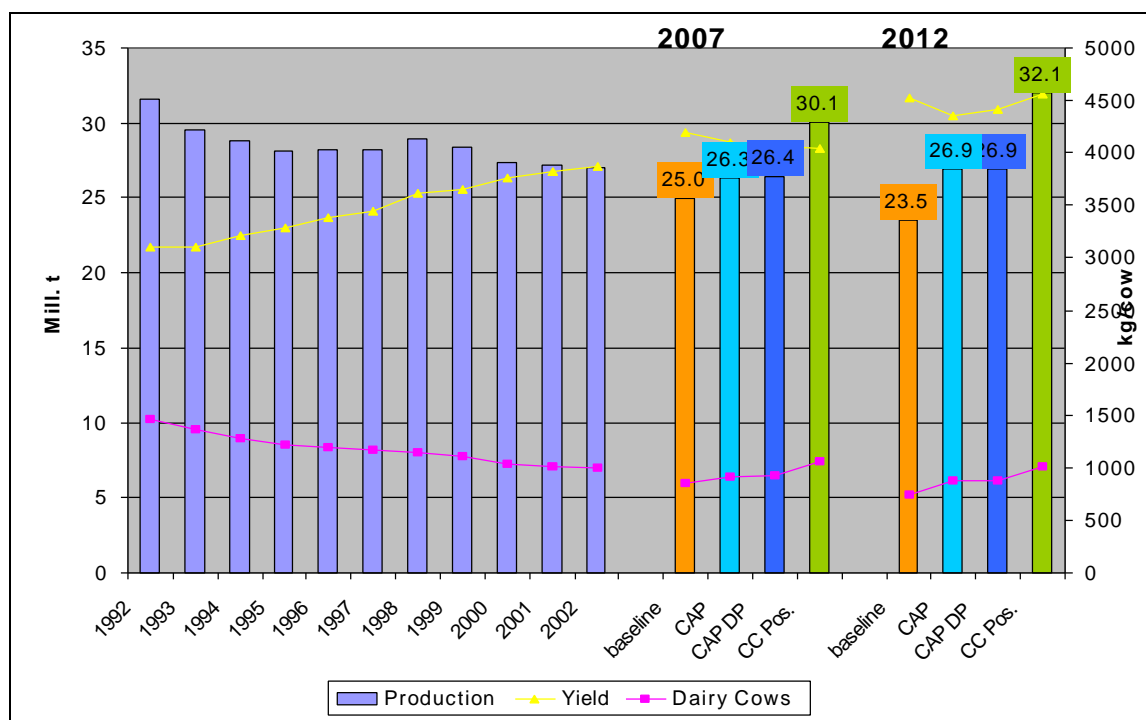
4.3.1. The Take-Off Scenario

In the presence of government efforts to restructure milk and dairy production in the CEECs, to increase competitiveness and considerable investments by foreign and domestic enterprises, this scenario considers that farms and dairies would adjust quickly to EU conditions. This implies also that direct sales and subsistence production would either shed resources or transform into full commercial dairy operations. This scenario therefore explores a very optimistic view of future developments of the production potential.

In the scenarios *CAP* and *CAP DP* milk production expands. In both scenarios production of the semi-subsistence sector declines and resources are shifted towards the market-oriented sector. Only Slovenia, facing lower milk prices under the *CAP*, would have difficulties to fulfil quotas in the scenario without direct payments for milk. In total, the CEECs reach total production levels, which include subsistence and semi-subsistence production, of between 26.3 Mill. t and 26.9 Mill. t in the accession scenarios. In *CC Position*, total milk production in the CEECs does not reach the requested quota levels in 2007. Only after a longer adjustment period, does milk production reach the levels of 32.1 Mill. t. Such developments would require a fundamental restructuring of milk production as well as the building up of new processing capacities in those CEECs which have a high share of direct sales and own consumption (see Figure 11).

Under domestic policies in the *baseline* scenario, production of bulk dairy products in the CEECs remains rather limited despite different levels of milk production. In 2012 production of milk powder and butter remains at levels of 330,000t and 240,000t, respectively. In the accession scenarios, production of these commodities increases. However, it appears that EU prices after *CAP* reforms would not provide sufficient incentives to produce large additional quantities. Cheese production, a sector in which much of the foreign direct investments are flowing into, on the other hand attracts an increasing part of the milk for processing.

Figure 11: Production of Milk, the Dairy Herd and Milk Yields in the CEECs under different Scenarios (Mill. t)

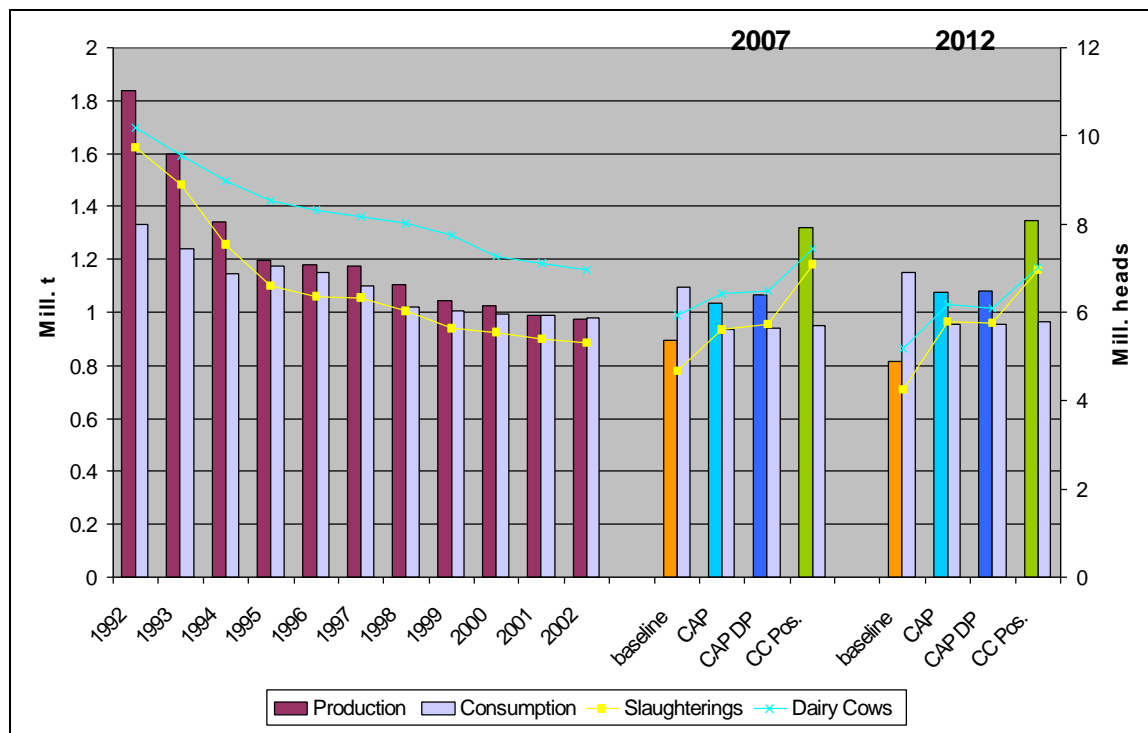


Only modest market surpluses for dairy products appear in the CEECs in the scenarios *CAP* and *CAPDP*, where quota levels were based on the reference period of 1995 to 1999. This can partly be explained by is the modest development of milk production as well as increasing consumer demand, especially for cheese and liquid milk and fresh milk products. Significantly more surpluses for in particular butter become visible in the *CC Position* scenario.

Beef production develops alongside the development of the dairy herds. On EU accession the dairy herd increases up to 6.42 Mill. heads in 2007 under *CAP*. With direct payments for cattle, beef production becomes more profitable. Direct payments for milk and cattle expand stocks of cattle such that in 2007 quota levels are better filled than without direct payments. The same happens in *CC Position*, and more cattle stock builds up.

Higher volumes of direct payments in *CC position*, i.e. a higher number of premium rights, increase the number of slaughterings by 1.25 Mill. heads, which indicates that a certain part of beef production decouples from dairy production (see Figure 12). Beef production increases in *CC Position* by 260,000 t above the levels in *CAP DP* in 2012.

Figure 12: Beef Market, and Herd Sizes in the CEECs under different Scenarios



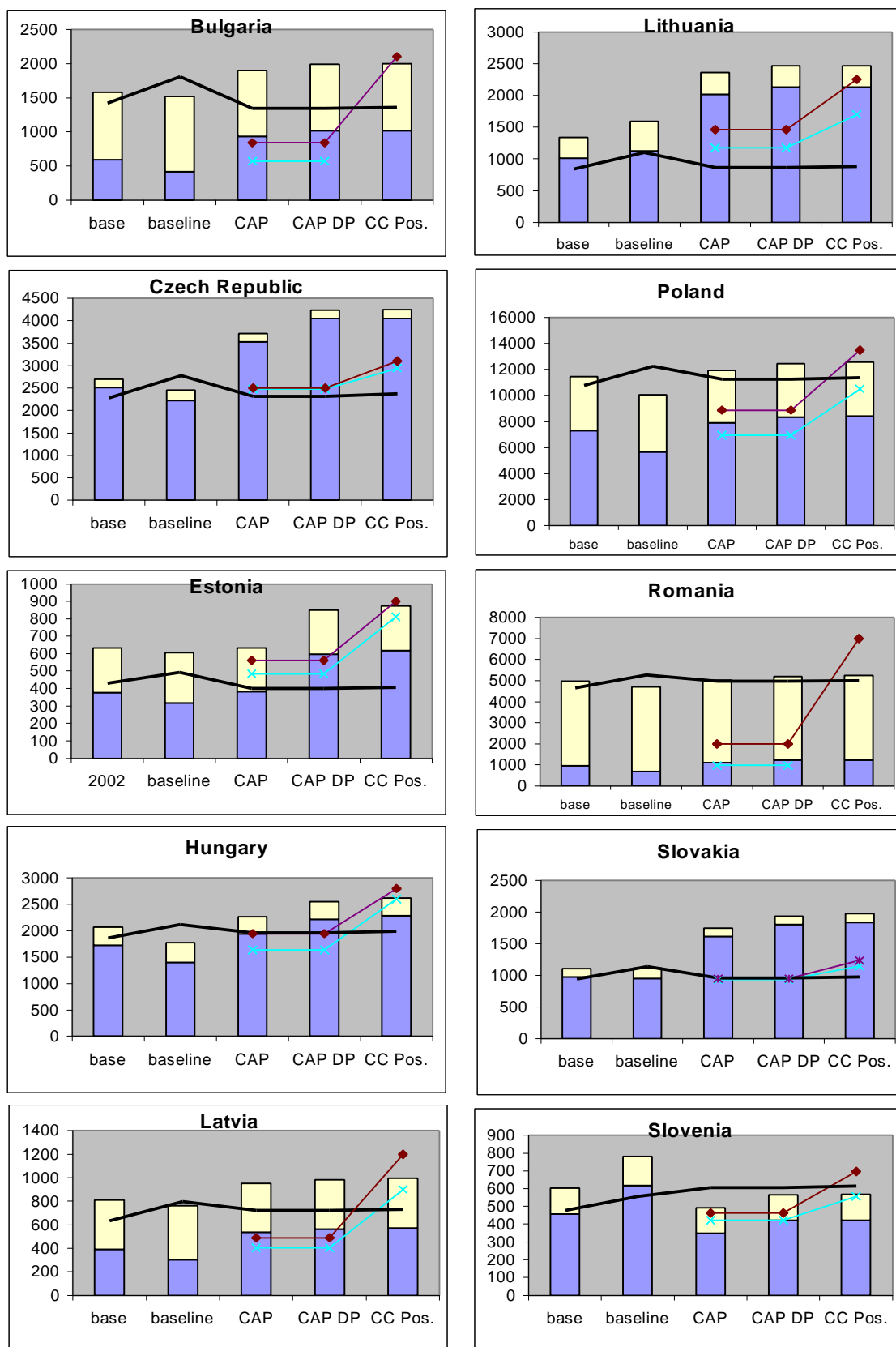
The declining demand for beef due to higher prices is the other factor in the development of market surpluses, which increase to 130,000t in 2012 in the *CAP* scenario. Market surpluses are higher in case higher numbers of beef premium rights are granted according to the positions of the Candidate Countries with market surpluses increasing from 120,000 t under *CAP DP* to 370,000 t. Granting premium rights on the basis of recent production like in *CAP DP* does not have a significant impact on production.

4.3.2. The Potential Milk Production in the CEECs

This scenario represents an alternative scenario for milk markets to the main scenarios presented above. In an attempt to separate commercial from semi-subsistence activities, production has been separated into deliveries and other purposes. Potential milk quotas under CAP regulations affect commercial production represented by deliveries to dairies and direct sales of all kinds. Milk quotas do not apply to subsistence production, though they are applied, as far as practically possible, to direct sales from semi-subsistence farms.

In contrast to the *take-off* scenario, the duality scenario explores the potential and theoretical developments in milk production compared to the quota levels, which in any case would represent binding ceilings to market-oriented milk production when eventually applied in the CEECs.

Figure 13: Potential Milk Production, Deliveries, Consumption and Quotas in base and in 2012 ('000. t)



■ potential market production
 ■ potential semi-subsistence
 —x— deliveries (quota)
 —◆— quota (del.+ dir. sales)
 — consumption

* approximations of direct sales for Bulgaria and Romania

This scenario does not analyse the effects of quotas and different types of distribution and redistribution systems of production rights in the agricultural sector. A choice of a particular system, like those presently applied in the current EU Member, greatly varies the transaction costs of quotas between growing and declining producers and thereby influence the pace of restructuring. Figure 13 shows the potential deliveries, which are an indicator of market-oriented production, and the potential semi-subsistence production vis-à-vis different quota levels. Moreover, the figures show the level of milk consumption of milk in the scenarios in 2012 as well as in the base period. The figures offer a country specific interpretation of potential market situations and surpluses of milk for the different quota levels.

In the Czech Republic, Slovakia, Lithuania and Hungary potential deliveries match or even surpass the quota level. This indicates that a quota becomes binding. The Czech Republic and Slovakia in particular show a large potential under CAP conditions. Estonia is able to expand deliveries to quota levels if direct payments are granted. The large-scale structure of Estonia's milk sector suggests that a switch from semi-subsistence activities to full commercial operations would take place more easily than in other countries.

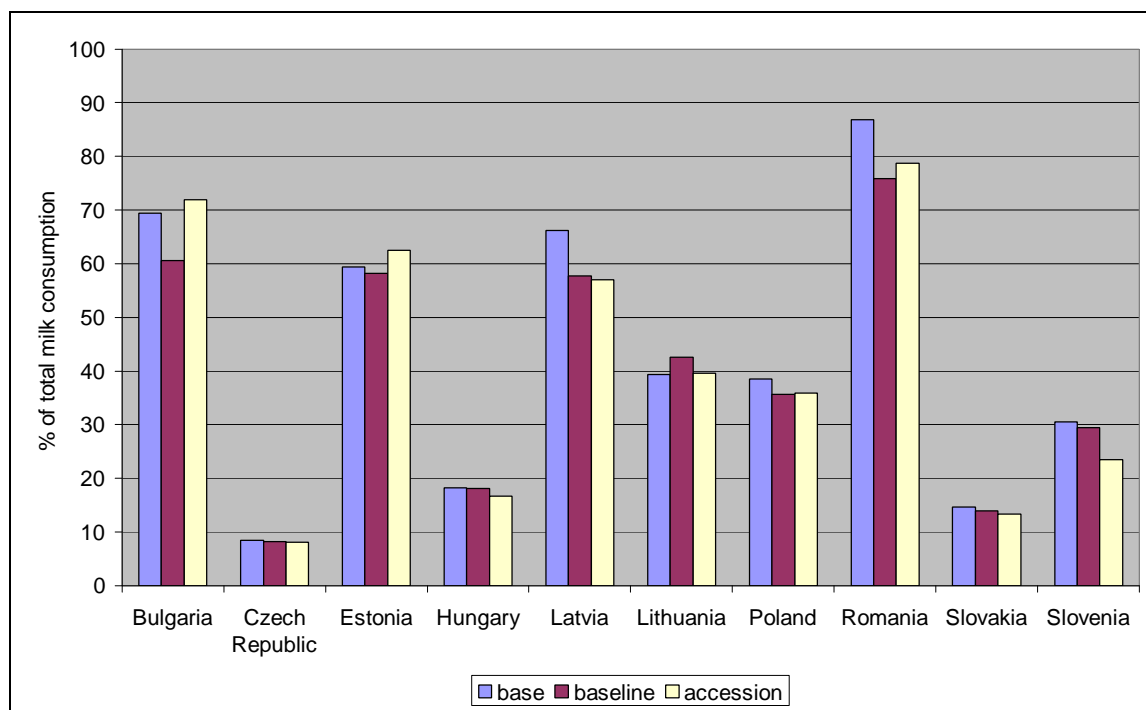
For the remaining countries, the picture appears to be rather mixed: Bulgaria, Poland, Latvia, and Slovenia seem to be unable to fulfil the quotas based on recent reference periods regardless of whether farmers receive direct payments or not. Even under the conditions of larger quotas in *CC Position*, market-oriented production would not be able to reach the requested levels.

The potential market-oriented production of the CEECs is 21.9 Mill. t under *CAP*. With direct payments the potential market-oriented production could increase to 24 Mill. t and under *CC Position* to 24.3 Mill. t. The requested quota would be theoretically binding in the Czech Republic, Slovakia and in Hungary and also for Lithuania in some scenarios. Taking the binding quota level into account the combined market-oriented production would be lower at 20.5 Mill. t, 20.6 and 22.8 Mill. t in *CAP*, *CAP DP*, and *CC Position*, respectively. Quota levels play a crucial role regarding overall consumption levels of around 25 Mill. t in the CEECs, if these had to be matched largely by deliveries.

The non-market-oriented production continues to satisfy around 37%, or 9.3 Mill. t, of total milk consumption, in the CEECs on average and represent in some countries a crucial part of milk consumption (see Figure 14).¹⁰ In general, accession leads to a slight decline of its importance, however due to increasing prices in countries such as Bulgaria and partly Estonia, its importance increases compared to the scenario with unchanged domestic policies. With declining subsistence in the course of economic development, a larger share of consumption will have to be satisfied by the markets and dairy production.

¹⁰ Again available data limits the distinction between subsistence consumption, consumption from semi-commercial sources and real market-oriented direct sales. In the case of Estonia some indication exists that commercial direct sales represent a large part in the displayed figures

Figure 14: Consumption of Semi-Subsistence Milk and Subsistence Consumption in Percent of Total Milk Consumption in the Candidate Countries in the Base Period and in 2012.



The pace of restructuring is of particular importance for CEEC milk production, consumption and milk surpluses. The development of subsistence milk production in the CEECs reflects a reaction to wider economic conditions than those defined by market and price policies. As a social feature of CEEC agriculture, it responds rather to development of the rural economy and rural labour markets in particular and is largely resistant to market changes. In implementing the CMO for milk, semi-subsistence plays an ambiguous role. On the one hand it could withhold scarce resources, like production rights and land, from the market sector, if these semi-subsistence farms received production rights. On the other hand it contributes in some countries to significant shares of domestic consumption, so that an expanding market production and relatively unchanged semi-subsistence production could lead to surpluses.

The critical question of how the quotas once introduced in the CEECs would affect restructuring has not been addressed in this quantitative analysis. The scenarios assume that the transfer of quotas could take place without costs, which is obviously not the case in reality. In reality, though, market-oriented farmers would have to purchase producer rights from the semi-subsistence sector. This part of the investment would then not be available for improving profitability and the income base of farmers. Regarding the huge task of restructuring relative to most current Member States in the EU, the question of restructuring, of the level and implementation of milk quotas is of high importance for most of the Candidate Countries.

4.4. Accession Scenarios: A Country by Country Perspective

The general trends examined in this chapter mainly show aggregate developments for the CEEC-10 as a whole, however some important country specific trends are visible. Figures

15 to 17 summarise the main trends in production, domestic use and marketable surplus for several specific commodities as well as for the Candidate Countries under the various policy scenarios. For presentation purposes, 2012 has been chosen in order to show the adjustments in production and consumption after a longer period following accession.

In terms of production and domestic use, the biggest agricultural players are Poland, Romania, Hungary, and the Czech Republic. Except for maize Poland is the biggest player for all agricultural products. It is of exceptional importance for other grains (rye, triticale, oats) both in terms of production and use. Poland's market surpluses of rye outweigh all other exporters in a single crop.

The other major players for cereal exports are Hungary for maize (6 to 6.5 Mill. t) and wheat (1.8 to 2.7 Mill. t), Romania for maize (2.2 to 2.4 Mill. t), and the Czech Republic for barley (1.3 to 1.5 Mill. t), while Poland develops increasing deficits of barley (0.5 to 0.8 Mill. t), wheat (0.2 to 1.2 Mill. t), and maize (0.5 to 1.1 Mill. t). Hungary becomes the prime exporter of cereals among the CEECs, mainly because it is able to expand production more rapidly than the other countries. The overall trend leading to these market surpluses remains valid: production slightly increases and domestic use stagnates.

Lithuania is a major player in the area of milk and beef production. In the scenarios *CAP* and *CAP DP*, Lithuania's market surpluses are comparable to those of Poland's but smaller than Romania's. Higher milk and higher volumes of headage payments in Poland under *CC Position* increase the market surpluses in Poland by 220,000 t. In this scenario Poland develops into the major exporter of beef in the CEECs, taking the lead position over from Romania.

For the marketable surpluses of dairy products butter has been chosen as an example. Lithuania is able to stabilise and slightly expand its exports and is the second biggest exporter after the Czech Republic. Poland on the other hand remains the major importer of butter.

Figure 15: Development of Production by Country in different Scenarios in 2012 (Mill. t)

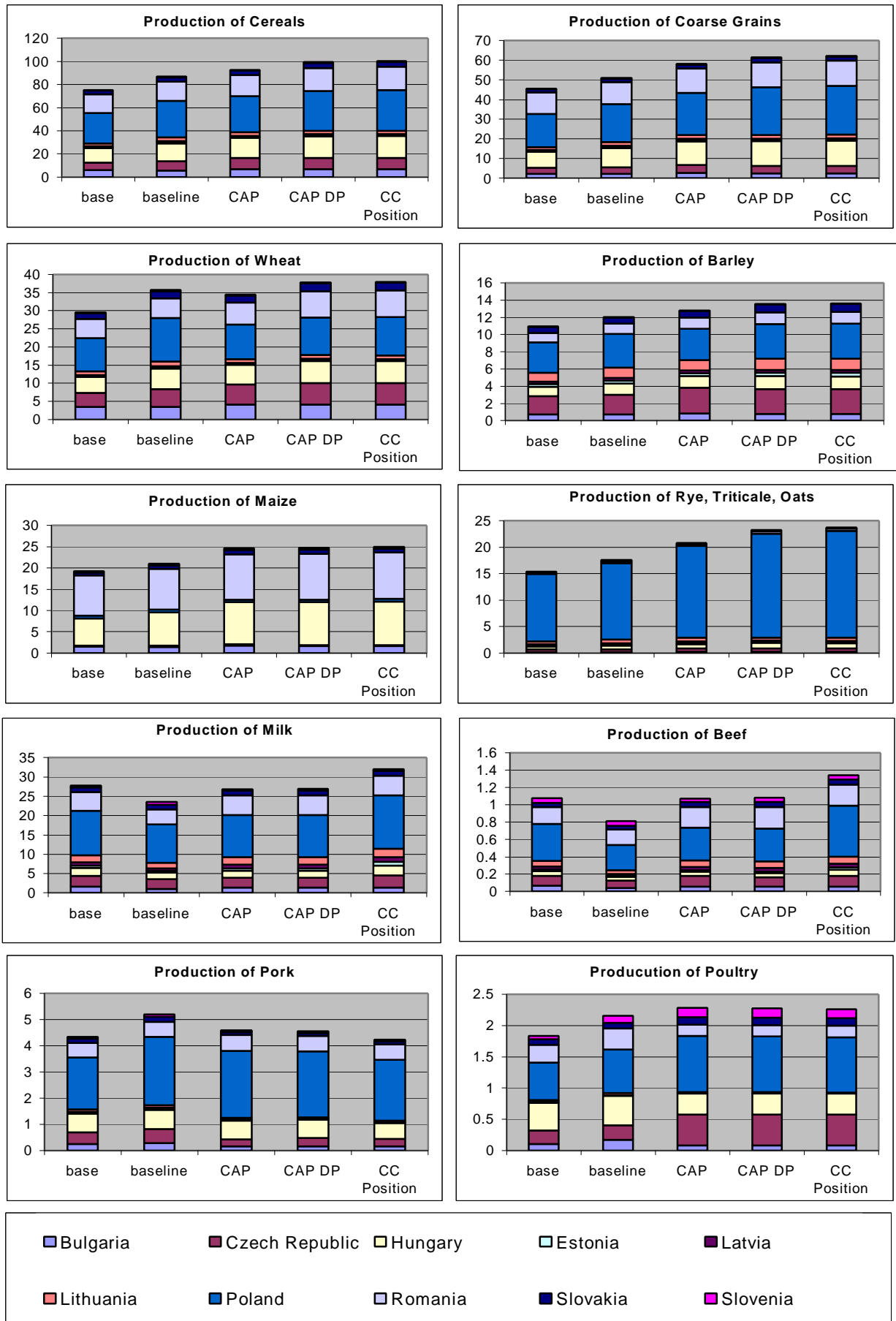


Figure 16: Development of Domestic Use under different Scenarios by Country in 2012 (Mill. t)

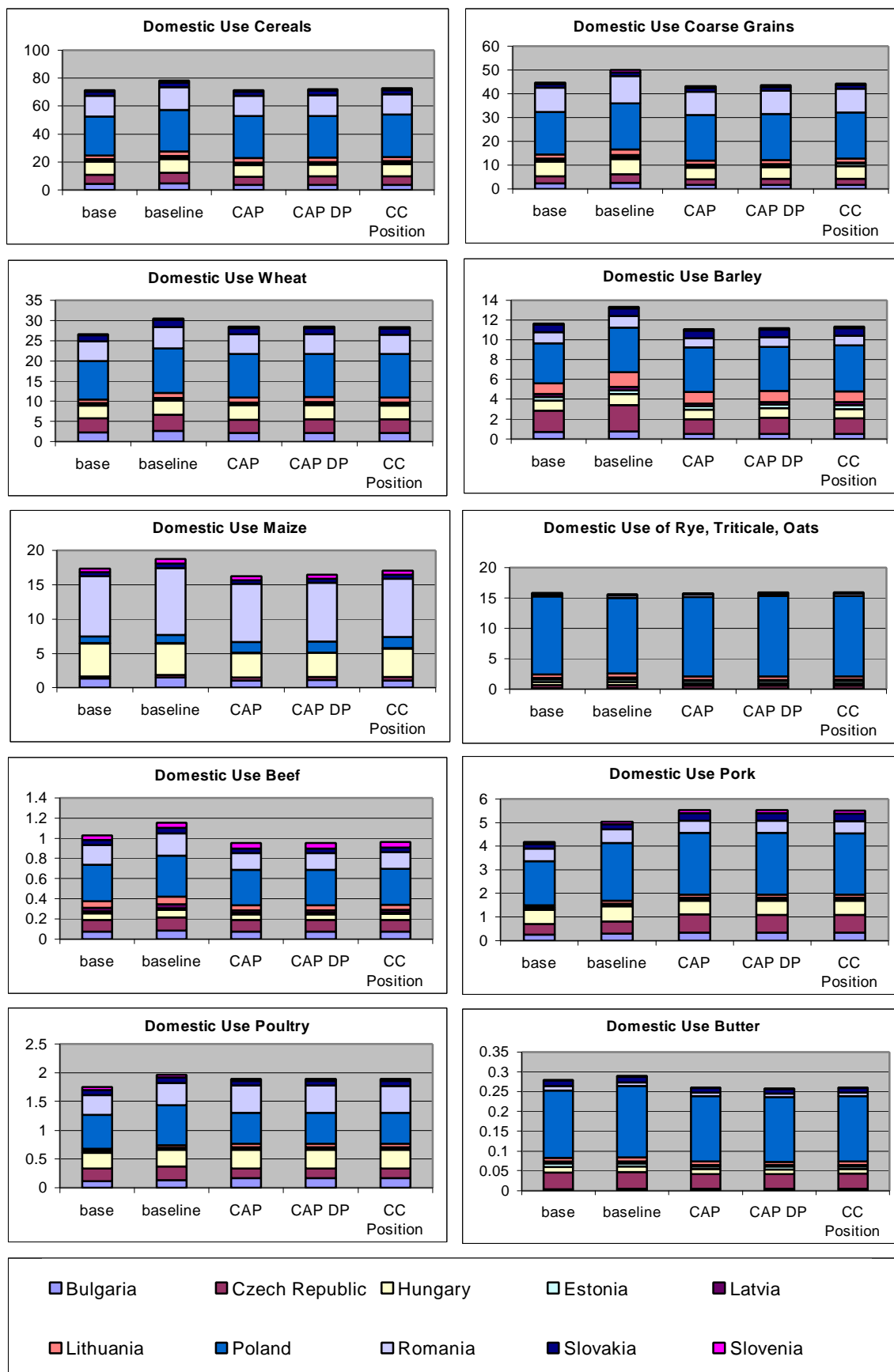
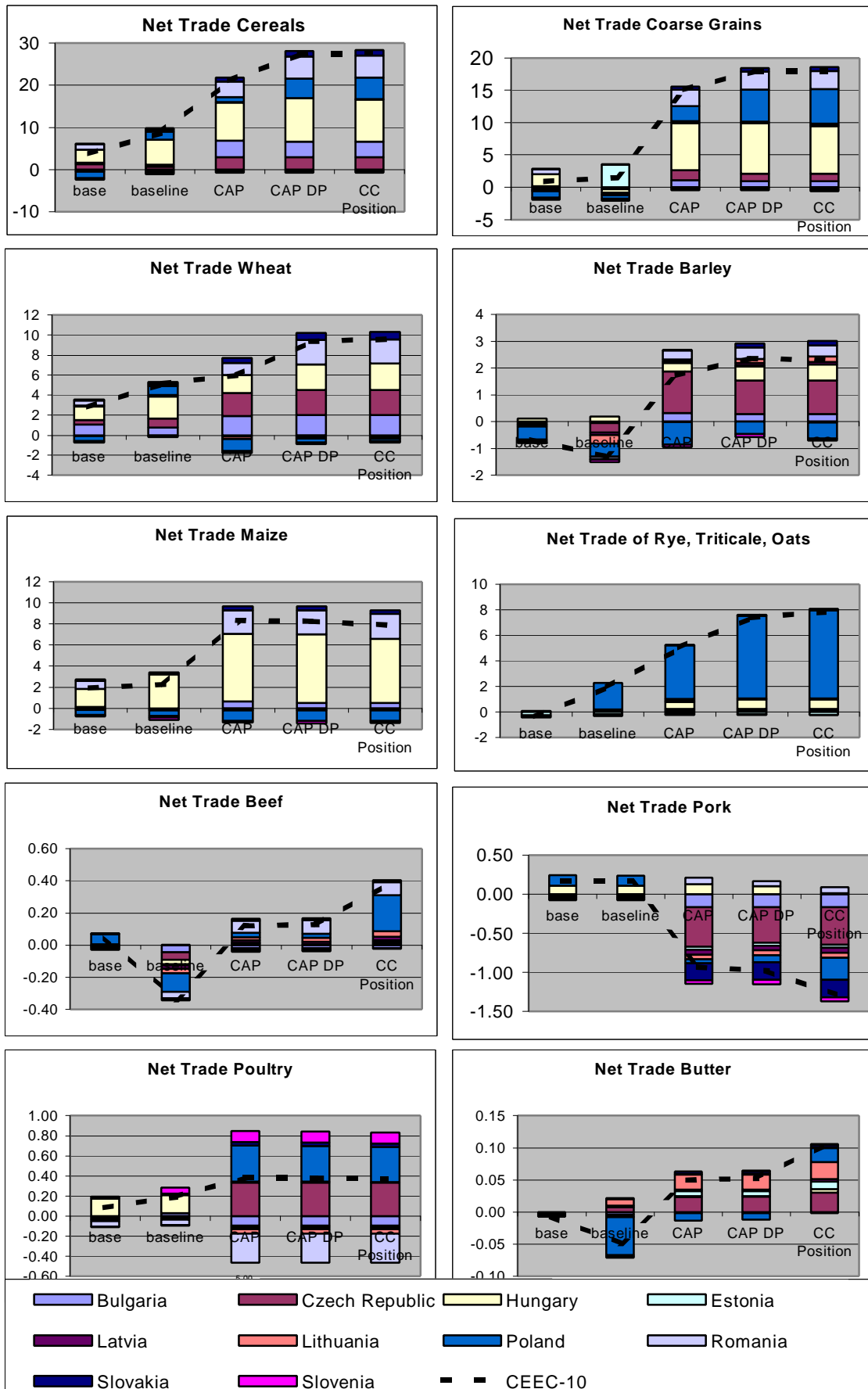


Figure 17: Development of Market Surpluses under different Scenarios by Country in 2012 Mill. t) (total CEECs in dotted line)



With regards to pork the steepest decline of production takes place in the Czech Republic, mainly because poultry production becomes more favourable. For poultry, Poland is the second major exporter after the Czech Republic, followed by Slovenia, which is able to expand poultry production on accession. The main importers of poultry remain Romania and Bulgaria as well as Lithuania. Hungary, on the other hand, is able to export poultry under domestic policy conditions and has a dominating role in *baseline*. Lower poultry and higher feed grain prices in the accession scenarios put pressure on poultry production in Hungary and market surpluses adjust downwards.

4.5. Underlying Medium and Long-Term Trends of Agricultural Markets in the CEECs with a View to Accession

The *baseline* results show that agriculture in the CEECs appears to be still under adjustment pressure. The labour intensive part of production, with comparable low added value, undergoes significant restructuring in the simulation period. Even the competitiveness of more capital intensive production such as cereals suffers from the macroeconomic developments, in particular the appreciation of real exchange rates and the increase of labour costs. Only in areas where a more protective policy is in place, such as for intensive livestock, does production develop more positively.

These developments generally confirm the past trends of markets in the CEECs, where despite price increases agricultural production generally has responded only to a limited extent. This has occurred even in countries such as the Czech Republic and Hungary where subsistence agriculture represents a negligible part of agricultural production and food consumption. This shows that the market-oriented part of agriculture has not been able to restructure production technologies fast enough to offset these developments.

The adjustment pressures for agriculture are different between countries. For milk production the greatest adjustment takes place in Romania, the smallest in the Czech Republic. There are basically two reasons for this: firstly, because of different macroeconomic developments and, secondly, because of different average cost structures of agricultural production. Macroeconomic developments are more stable in the Czech Republic than in Romania. Production in Romania is more labour intensive, while it is more capital intensive in the Czech Republic. To qualify the baseline results, a third consideration has to be added.

One of the characteristics of the CEECs is a dualistic structure of agriculture, which differs in importance from country to country. The subsistence and semi-subsistence part and a market-oriented part of agriculture coexist and compete for the resources such as land and capital. Subsistence and semi-subsistence farming has proved to be a stable feature and a main factor for the stabilisation of production during the early phase of transition. In recent years, the share of subsistence and semi-subsistence farmers increased in some countries. Subsistence farming serves other objectives than profit maximisation alone. In countries which have undergone dramatic changes and restructuring, agriculture has served as a social buffer or as complementary social security providing an element of food security and additional minimum income for rural and urban families. This choice would appear to represent rational behaviour under the specific conditions of low-income transition economies. In addition, structural change in family farm dominated agriculture usually happens in an inter- rather than an intra-generation perspective, a fact not completely unknown in the EU-15. With some reason, it could therefore be suggested that

subsistence and semi-subsistence farming might be a persistent characteristic in the CEECs at least for the period in question.

Unfortunately, not much statistical information is available to extend the methodology used here to the special behaviour of this – in some countries – important part of agriculture and food consumption. Only for milk production is more reliable data available, which is used in the analysis. The *take-off* scenario makes the relatively optimistic assumption that agriculture in total would respond to market signals by transferring resources from the subsistence part to the market-oriented part.

With a persistent subsistence sector in some countries like Bulgaria, Latvia, Poland and Romania, where subsistence and semi-subsistence farming has a significant share of agricultural production, the results presented for the *baseline* scenario could change, mainly by stabilising production. The interpretation of the baseline results alters under these considerations. The increasing pressure on agriculture might therefore be only partly expressed in declining agricultural production but consequently more in deteriorating agricultural income per employee in general and for the subsistence sector in particular. This might highlight an increasing poverty problem for some CEECs under existing domestic policies.

A key point in this respect is the development of factor markets, which help to shift production factors on inter and intra sectoral scales. Though capital markets are important, functioning rural labour markets are more important for small-scale agriculture as it would help to develop alternative income sources. Usually structural programmes and rural development schemes are focusing on this objective.

The underlying trends in the baseline scenario are also visible in the *accession scenarios*. The CAP provides favourable conditions for crop and cattle production, due to the level of prices as well as of direct payments. The outlook for grain-fed livestock, especially pork, is less favourable.

Direct payments attract additional area and encourage additional beef and milk production, despite proportional reduction of hectare and cattle payments for the overshoot. The production effects of area payments add up to an additional 4 to 6.5 Mill. t of market surpluses on top of 21 Mill. t related to pure price effects. At the same time oilseed production benefits from direct payments, and increases. High levels of direct payments, however, lead to a further production of less competitive crops such as rye. High volumes of direct payments as requested in *CC Position* scenario lead to a beef production more independent from that of the dairy herd.

5. A PERSPECTIVE FOR THE ENLARGED EU

The previous chapter shows the effects of introducing the CAP on CEEC markets. So far an important part of the analysis is missing: Integration into the EU means integration into the single market. Agricultural markets in the EU represent community wide institutions, i.e. balancing effects appear between regions with market surpluses and those with deficits. Moreover, prices are able to adjust on the single market to react to supply and demand changes. To assess the effects of accession on agricultural markets more fully, the perspective of accession has to be widened from the CEECs to the enlarged EU. The complete market effects of accession, therefore, cannot be analysed on a basis of markets of a sub region of the enlarged EU. The question, which is addressed below, relates to the

effects of accession on the EU-15 and the EU-25 agricultural markets. For technical and data reasons the simulations cover only the 10 individual CEE Candidate Countries. However, the accession of Cyprus and Malta is unlikely to dramatically change the results for the commodities in this analysis.

5.1. The Markets for Cereals and Grain Fed Livestock

The CEECs contribute to the market surplus of cereals in the EU with levels of 20-27 Mill. t depending on the accession scenario and the year. Most of these market surpluses are wheat and maize, followed by rye and barley. In the scenarios with direct payments, production in the CEECs is between 5 to 8 Mill. t higher than in the accession scenario without direct payments. This production effect contributes to the market surpluses in the CEECs (Table 4).

Table 4: Market Balances for Cereals in the EU under different Scenarios (Mill. t)

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	208.02	221.20	217.82	217.58	217.77	226.91	223.96	223.55	223.71
CEEC-10	75.10	83.42	92.23	97.00	97.20	86.78	92.63	99.33	100.24
EU-25	(283.12)	(304.62)	310.05	314.59	314.97	(313.69)	316.59	322.88	323.95
domestic use									
human demand									
EU-15	59.73	64.11	64.61	64.69	64.66	66.03	66.43	66.53	66.52
CEEC-10	20.94	21.45	19.91	20.03	20.07	21.51	21.27	21.28	21.28
EU-25	(80.67)	(85.56)	84.52	84.72	84.73	(87.54)	87.70	87.81	87.80
feed demand									
EU-15	118.80	126.76	132.35	133.01	133.39	127.33	132.89	133.47	133.76
CEEC-10	44.42	47.81	40.60	40.89	41.66	50.25	41.81	41.91	42.56
EU-25	(163.22)	(174.57)	172.95	173.90	175.05	(177.58)	174.70	175.37	176.33
other use									
EU-15	5.94	6.11	6.05	6.04	6.04	6.34	6.28	6.27	6.27
CEEC-10	6.03	4.70	8.07	7.76	8.28	6.34	8.44	8.79	8.83
EU-25	(11.97)	(10.81)	14.11	13.80	14.32	(12.68)	14.73	15.06	15.10
domestic use									
EU-15	184.48	196.97	203.01	203.74	204.09	199.70	205.60	206.27	206.55
CEEC-10	71.38	73.97	68.57	68.68	70.01	78.10	71.53	71.98	72.67
EU-25	(255.86)	(270.94)	271.58	272.42	274.10	(277.80)	277.13	278.24	279.22
annual marketable surplus									
EU-15	23.54	24.22	14.81	13.84	13.68	27.21	18.36	17.28	17.16
CEEC-10	3.72	9.45	23.67	28.32	27.19	8.68	21.10	27.35	27.57
EU-25	(27.26)	(33.67)	38.48	42.17	40.87	(35.89)	39.46	44.63	44.72

As a result of accession, two effects occur on EU-25 cereal markets. Firstly, cereal prices adjust to the new market surplus situation, and, secondly, livestock production increases in the EU-15. Feed demand in the EU-15 expands by around 5 to 6 Mill. t and production of cereals decreases by 1 to 3 Mill. t. Therefore, market surpluses of the EU-15 drop by 4 to 9 Mill. t compared to non-accession in *baseline*. With these damping factors, caused by the integration into the single market, the EU-25 develops market surpluses of 47 to 52 Mill. t in the *accession scenarios* compared to market surpluses of 24 to 27 Mill. t without accession. In any case, the expansion of marketable cereal surpluses in the EU-25 is less on the single market than the sum of market surpluses of current and new Member States separated by a border. Only when combining regions with deficits and surpluses would the single market be able to balance out the effects.

Most of the cereal market surpluses emerge in the area of wheat and maize, the former which could be exported without refunds, and the latter which is consumed on the internal markets (see tables in the Annex 3). For these cereal markets either the competitiveness on world markets or the flexibility on internal markets provides enough room for manoeuvre such that market surpluses, probably represent opportunities rather than disadvantages.

However, the markets for barley and rye are less flexible. For both commodities internal prices are higher, in the case of rye significantly higher, than world market prices and prices in the EU-15 are already at intervention levels before accession. While this situation for rye is independent of the development of exchange rates, the result for barley is very sensitive regarding this variable. Should the value of the Euro stay below parity relative to the USD, exports of barley could be made without the need for refunds. In the simulations, the demand for export refunds and intervention storage increases, especially for rye where up to 8 Mill. t of annual market surpluses in the CEECs add to around 2.2 Mill. t in the EU-15.

Table 5: Market Balances for Rye in the EU and the CEECs under different Scenarios (Mill. t)

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	6.66	6.91	6.91	6.92	6.91	7.29	6.96	6.92	6.91
CEEC-10	6.27	7.70	10.42	13.03	13.13	8.40	11.28	13.65	14.08
EU-25	(12.93)	(14.61)	17.33	19.95	20.04	(15.69)	18.24	20.57	21.00
domestic use									
human demand									
EU-15	1.69	1.70	1.70	1.70	1.70	1.71	1.70	1.70	1.70
CEEC-10	2.36	2.57	2.30	2.31	2.31	2.73	2.44	2.44	2.44
EU-25	(4.05)	(4.26)	4.00	4.01	4.01	(4.44)	4.14	4.14	4.14
feed demand									
EU-15	1.82	2.85	2.84	2.85	2.84	2.86	2.84	2.85	2.84
CEEC-10	3.06	2.85	2.81	2.81	2.81	2.92	2.75	2.75	2.75
EU-25	(4.88)	(5.69)	5.64	5.65	5.66	(5.78)	5.59	5.59	5.59
other use									
EU-15	0.20	0.19	0.19	0.19	0.19	0.19	0.18	0.18	0.18
CEEC-10	0.93	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
EU-25	(1.13)	(1.07)	1.07	1.07	1.07	(1.07)	1.06	1.06	1.06
total domestic use									
EU-15	3.71	4.73	4.72	4.73	4.72	4.76	4.72	4.72	4.72
CEEC-10	6.36	6.30	6.00	6.00	6.01	6.53	6.07	6.07	6.08
EU-25	(10.06)	(11.03)	10.71	10.73	10.74	(11.29)	10.79	10.79	10.79
annual marketable surplus									
EU-15	2.96	2.19	2.20	2.19	2.19	2.53	2.25	2.20	2.20
CEEC-10	-0.36	1.40	4.42	7.03	7.12	1.87	5.20	7.58	8.01
EU-25	(2.59)	(3.58)	6.62	9.22	9.31	(4.39)	7.45	9.78	10.20

Table 6: Market Prices for Cereals and Oilseeds in the EU under Different Scenarios (€/t)

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
wheat	127.74	115.83	113.93	113.97	114.02	109.83	108.16	108.43	108.42
barley	121.74	101.31	101.31	101.31	101.31	101.31	101.31	101.31	101.31
maize	144.15	127.19	113.03	111.61	112.54	118.73	108.46	106.39	107.04
rye	119.50	101.31	101.31	101.31	101.31	101.31	101.31	101.31	101.31
oilseeds	233.03	233.03	236.53	240.13	240.17	219.66	223.56	228.89	228.88

Table 6 shows the development of prices in the EU under different scenarios. In general, market prices develop favourably due to the CAP reforms. World market prices for wheat are higher than the intervention price of 101.35€/t. However, world market prices for wheat in € fall constantly, mainly because of the revaluing Euro against the US\$. On accession maize prices in the EU-25 are approximately 10 to 15€/t lower than without accession.

One should note, however, that the model does not recognise transport costs, which might eventually play a role in the marketing of regional market surpluses. Regarding the main exporting countries of the CEECs in the scenarios, Hungary and Romania (see Figure 8), transport costs higher than the price decrease of 10 to 15€/t might favour intervention as the main marketing tool instead of transporting it to the deficit regions in the EU. In this case, intervention stocks of maize might appear in these countries, while imports from third countries still take place in the rest of the EU. This might keep average prices in the EU higher, while prices in Romania and Hungary would be at the intervention price level. Such a scenario would lead to less maize production in the CEECs and to less maize consumption in the EU-15.

Prices fall in the CEECs causing a decline of production vis-à-vis increasing demand. The deficit of the pork markets in the CEECs of up to 1.5 Mill. t triggers additional production of 0.8 to 1.4 Mill. t in the EU-15. Production in the EU-15 benefits from increasing demand and lower prices of feed grains in the accession scenarios. Moreover, the EU-25 benefits from the increased export opportunities of 0.15 Mill. t resulting from third country markets brought in by the new Member States (Table 7).

Table 7: Market Balances for Pork in the EU under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	18.05	18.76	19.52	19.67	19.96	19.44	20.25	20.33	20.59
CEEC-10	4.34	4.80	4.29	4.23	3.98	5.19	4.59	4.54	4.22
EU-25	(22.39)	(23.56)	23.81	23.90	23.94	(24.63)	24.84	24.88	24.81
domestic use									
EU-15	16.96	17.62	17.43	17.41	17.40	18.29	18.08	18.06	18.02
CEEC-10	4.17	4.63	5.15	5.20	5.16	5.02	5.52	5.52	5.50
EU-25	(21.14)	(22.25)	22.58	22.61	22.57	(23.32)	23.60	23.58	23.52
annual marketable surplus									
EU-15	1.09	1.14	2.09	2.26	2.56	1.15	2.18	2.27	2.56
CEEC-10	0.17	0.17	-0.86	-0.97	-1.19	0.17	-0.93	-0.98	-1.28
EU-25	(1.26)	(1.31)	1.23	1.29	1.38	(1.32)	1.24	1.29	1.28

Prices in the EU in the different scenarios reflect the demand driven characteristics of these markets. In general, accession increases market prices by approximately 18 to 21€/t cwe. However, accession decreases prices for poultry (chicken) by approximately 20€/t cwe (Table 8).

Table 8: Market Prices for Meat in the EU under Different Scenarios (€/t cwe)

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
beef	2,809.42	2,671.55	2,670.56	2,669.10	2,609.49	2,554.74	2,552.68	2,549.97	2,502.49
pork	1,053.56	980.03	998.55	999.06	1,000.48	943.99	965.07	965.46	968.44
poultry	1,308.08	1,276.84	1,255.31	1,255.23	1,256.21	1,247.75	1,235.80	1,235.32	1,236.49

In the early phase after accession poultry production in the CEECs is approximately 300,000 t higher than under domestic policies, because prices initially increase compared to the situation without accession. However, production of poultry stagnates later in the CEECs up to 2012. The growing consumption of poultry in the CEECs as well as in the EU-15 is then mainly served by EU-15 producers. The EU-15 is able to expand production by 0.4 Mill. t until 2012. As a result, market surpluses in the CEECs decrease from 0.5 Mill. t to 0.38 Mill. t., whereas market surpluses of the EU-25 stabilise at 0.73 Mill. t.

Table 9: EU Market Balance for Poultry under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	9.20	10.12	9.83	9.85	9.86	10.38	10.20	10.21	10.21
CEEC-10	1.83	2.03	2.36	2.25	2.25	2.15	2.28	2.28	2.26
EU-25	(11.03)	(12.15)	12.19	12.10	12.11	(12.54)	12.48	12.48	12.47
domestic use									
EU-15	8.66	9.51	9.62	9.61	9.60	9.79	9.85	9.85	9.84
CEEC-10	1.75	1.85	1.74	1.76	1.75	1.96	1.90	1.90	1.89
EU-25	(10.41)	(11.37)	11.35	11.37	11.35	(11.75)	11.75	11.75	11.74
annual marketable surplus									
EU-15	0.54	0.60	0.21	0.25	0.26	0.60	0.35	0.35	0.37
CEEC-10	0.09	0.18	0.63	0.49	0.51	0.19	0.38	0.38	0.37
EU-25	(0.62)	(0.78)	0.84	0.74	0.77	(0.79)	0.74	0.73	0.73

5.2. Markets for Beef

Beef production in the CEECs is relatively small compared to that in the EU-15. Despite bringing in new market surpluses of around 0.1 Mill. t to 0.38 Mill. t, market prices on the single market are able to balance the effects, i.e. they decline and thus stimulate consumption and discourage production.

The average price decreases in *CAP* and *CAP DP* would only be comparable low, relative to the baseline. It can be expected that in first years after accession eventual surpluses of the CEECs would mainly consist of lower average qualities than that of the EU-15. Under these consideration pressure on prices for lower qualities would increase, while higher qualities would be less affected.

In the scenarios with high beef market surpluses in the CEECs, prices are between 50 and 70 €/t lower than in the baseline scenario of the respective year. As a response, beef

production in the EU-15 declines and beef consumption picks up such that EU-25 market surpluses are stabilised at around 0.37 to 0.39 Mill. t (see Table 9).

However, the simulations do not take into account the effects of changes of consumer preferences. If consumption of beef falls further than foreseen compared to that of other meats, the price pressure on beef markets in the Union would be substantially higher.

Table 9: Market Balances for Beef in the EU under different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	7.89	7.84	7.80	7.76	7.61	8.03	8.01	8.00	7.85
CEEC-10	1.08	0.89	1.04	1.12	1.32	0.81	1.07	1.08	1.34
EU-25	(8.97)	(8.74)	8.84	8.87	8.93	(8.84)	9.09	9.08	9.20
human demand									
EU-15	7.03	7.54	7.55	7.58	7.67	7.73	7.75	7.75	7.84
CEEC-10	1.03	1.09	0.93	0.91	0.95	1.15	0.95	0.95	0.96
EU-25	(8.06)	(8.63)	8.49	8.48	8.61	(8.88)	8.70	8.71	8.80
annual marketable surplus									
EU-15	0.86	0.30	0.25	0.18	-0.06	0.29	0.27	0.24	0.01
CEEC-10	0.05	-0.20	0.10	0.21	0.37	-0.34	0.12	0.13	0.38
EU-25	(0.90)	(0.10)	0.35	0.39	0.31	-(0.05)	0.39	0.37	0.39

5.3. Markets for Milk and Dairy Products

The impact of enlargement on dairy markets depends on the level of quotas fixed on accession and the structure of dairy production in the CEECs as well as in the EU-15. The analysis focuses (i) on the development of the market-oriented production comprising of deliveries to dairies and commercial direct sales and (ii) on the non-market production comprising of subsistence (own consumption) and limited direct sales on a semi-legal basis of small scale farms. Quotas would affect the market-oriented sector, while the subsistence part of the production would remain unaffected by these supply management tools. Accession of the CEEC-10 adds another 26.3 and 26.9 Mill. t of milk in the *CAP* scenarios. The quotas, which define deliveries and direct sales, represent the major part of the projected production in the CEECs. In the *CAP scenarios* the sum of milk quotas is 20.5 Mill. t (including approximations for Bulgaria and Romania). The other, non-negligible, part of milk production is subsistence and semi-subsistence production. This latter part of production is substantially higher than in the EU-15.

For a number of countries in *CC Position* quotas are substantially higher than the quotas based on recent reference periods as applied in the *CAP scenarios*. Under these conditions market-oriented production would be able to significantly expand. In fact, in Poland, Romania, Bulgaria, and Latvia such quotas do not pose any supply limiting effects to the market-oriented sector. On the other hand, the subsistence and part of the semi-subsistence sector remains, largely unaffected, in place.

The simulations in *CC Position* show the huge task of restructuring to fill the requested quota levels. Total milk production, which includes subsistence and semi-subsistence, does not reach the requested quota levels in the CEECs. Only after a longer adjustment period until 2015, would milk production reach the levels of 34.45 Mill. t. This level is even below the level of requested quotas of the Candidate Countries of 34.8 Mill. t. Such

developments as simulated in *CC Position* imply a deep restructuring of milk production (substantial reduction of the non-market production) as well as the building up of new processing capacities in those CEECs with a high share of direct sales and own consumption.

Taking all 10 CEECs together, potential market-oriented milk production, which includes the relatively high part of the CEEC quota currently reserved for direct sales - are 21.9 Mill. t under *CAP*. With direct payments the potential market-oriented production increases to 24 Mill. t and under *CC Position* to 24.3 Mill. t. However, taking into account that the quotas are binding the real market-oriented production (deliveries and direct sales) remains at lower levels of 20.4 Mill. t, 20.6 Mill. t and 22.7 Mill. t in *CAP*, *CAP DP*, and *CC Position*, respectively. The EU-25 produce around 151 to 156 Mill. t of milk by 2012.

Table 10: Production and Use of Domestically Produced Milk in the EU under different Scenarios (Mill. t)

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	121.20	124.22	124.22	123.83	122.35	124.22	124.22	124.22	124.22
CEEC-10	27.81	24.96	26.30	26.89	30.34	23.49	26.89	26.94	32.05
EU-25	(149.01)	(149.18)	150.52	150.72	152.68	(147.71)	151.11	151.16	156.27
liquid and fresh milk products									
EU-15	30.00	32.52	32.87	33.09	33.37	32.86	33.75	32.71	34.18
CEEC-10	10.61	10.61	10.61	9.54	9.65	10.14	10.14	10.14	10.19
EU-25	(40.61)	(43.13)	43.48	42.63	43.03	(42.99)	43.88	42.85	44.37
manufacturing									
EU-15	84.40	84.90	84.55	83.94	82.17	84.56	83.67	84.71	83.24
CEEC-10	17.20	14.35	15.69	17.35	20.68	13.36	16.75	16.80	21.86
EU-25	(101.60)	(99.25)	100.24	101.29	102.86	(97.92)	100.42	101.52	105.10

Following the CAP reforms, consumption of fresh dairy products and cheese increases and dairy production adjusts to this more profitable section of the markets. These products draw away milk from the use in butter and skimmed milk powder. Despite this fact, surpluses for butter and skimmed milk powder remain visible in the scenarios. As a result prices for skimmed milk powder and butter remain at the effective intervention price level.

Table 11: Market Prices for Milk and Dairy Products in the EU under Different Scenarios (€/t)

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
milk	294.19	282.35	277.57	276.23	273.28	294.15	279.93	277.05	274.17
SMP	2,078.20	1,746.90	1,746.90	1,746.90	1,746.90	1,746.90	1,746.90	1,746.90	1,746.90
butter	3,199.45	2,566.52	2,566.52	2,566.52	2,566.52	2,566.52	2,566.52	2,566.52	2,566.52
cheese	3,002.43	3,114.82	3,104.09	3,077.09	3,031.06	3,252.03	3,213.09	3,153.47	3,110.56

As a result of accession the market surpluses originating from the EU-15 further improve, while some surpluses from the CEECs appear. (Table 12). For the high value added part of the dairy market, e.g. cheese and fresh dairy products, production increases in the EU-15 due to accession but also expands in the CEECs (see Table 13).

Table 12: Market Balances for Butter in the EU under different Scenarios (Mill. t)

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	1.79	1.80	1.79	1.79	1.80	1.83	1.80	1.80	1.80
CEEC-10	0.33	0.28	0.31	0.32	0.36	0.24	0.32	0.32	0.37
EU-25	(2.12)	(2.08)	2.10	2.10	2.16	(2.07)	2.11	2.12	2.17
domestic use									
EU-15	1.73	1.68	1.68	1.68	1.68	1.66	1.66	1.66	1.66
CEEC-10	0.28	0.30	0.27	0.27	0.27	0.29	0.26	0.26	0.26
EU-25	(2.00)	(1.98)	1.95	1.95	1.96	(1.95)	1.92	1.92	1.92
annual marketable surplus									
EU-15	0.07	0.11	0.10	0.10	0.12	0.16	0.14	0.14	0.14
CEEC-10	0.05	-0.02	0.04	0.05	0.09	-0.04	0.06	0.06	0.11
EU-25	(0.11)	(0.10)	0.15	0.15	0.21	(0.12)	0.19	0.19	0.25

Table 13: Market Balances for Cheese *in the EU under different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	6.99	7.37	7.44	7.45	7.31	7.58	7.80	7.80	7.78
CEEC-10	0.91	0.73	0.83	0.84	1.08	0.60	0.81	0.81	1.07
EU-25	(7.91)	(8.10)	8.26	8.28	8.39	(8.18)	8.61	8.61	8.85
domestic use									
EU-15	6.92	7.11	7.12	7.17	7.26	7.32	7.32	7.43	7.51
CEEC-10	0.85	0.94	0.82	0.83	0.84	1.04	0.89	0.90	0.91
EU-25	(7.76)	(8.05)	7.94	8.00	8.10	(8.14)	7.99	8.11	8.20
annual marketable surplus									
EU-15	0.08	0.26	0.32	0.28	0.05	0.26	0.49	0.38	0.27
CEEC-10	0.07	-0.20	0.01	0.00	0.24	-0.44	-0.08	-0.09	0.17
EU-25	(0.15)	(0.05)	0.32	0.28	0.29	-(0.17)	0.40	0.29	0.43

*excluding processed cheese

In conclusion, dairy markets in the enlarged Union as a whole further shift towards high value added products. However a certain specialisation of the CEECs on bulk dairy products remains visible in the early phase after accession. The simulations show that this is not a one way street, i.e. the dairy industries in the new Member States will also benefit from this development and further diversify their structure towards high value added dairy products but with a certain time lag.

With regards to the dairy markets an important consideration should be added. The simulations treat cheese as a homogeneous product, which is in reality not the case. Moreover, price differences for cheeses are rather explained by quality differences than policies. The simulations assume a significant restructuring of cheese producing and improvement of qualities in the CEECs, which could happen if current investment trends are reinforced in future. In the event that cheese-producing in the CEECs and other high value added parts of the dairy industry does not follow the assumed trend, the pressure on butter and milk powder markets will significantly increase and more surpluses than foreseen could be expected in the scenarios.

6. THE DEVELOPMENT OF AGRICULTURAL OUTPUT AND INCOME IN THE CEECS AND THE EU-15

As we have seen, enlargement is expected to lead to an increase in agricultural production in the CEECs. In this respect crops seem to benefit more than livestock production. This section examines the effects of accession on the development of the value of agricultural production (agricultural output) and sectoral income as measured by Gross Value Added (GVA).¹¹ In addition, the impact of accession has been assessed for a hypothetical 20 hectare farm.

For this purpose output and GVA are estimated for the whole agricultural sector, by combining the model simulations with the statistics of the Economic Accounts for Agriculture. Output is measured at market prices, while GVA is calculated at basic prices, i.e. including direct payments in the scenarios simulating full direct payments.

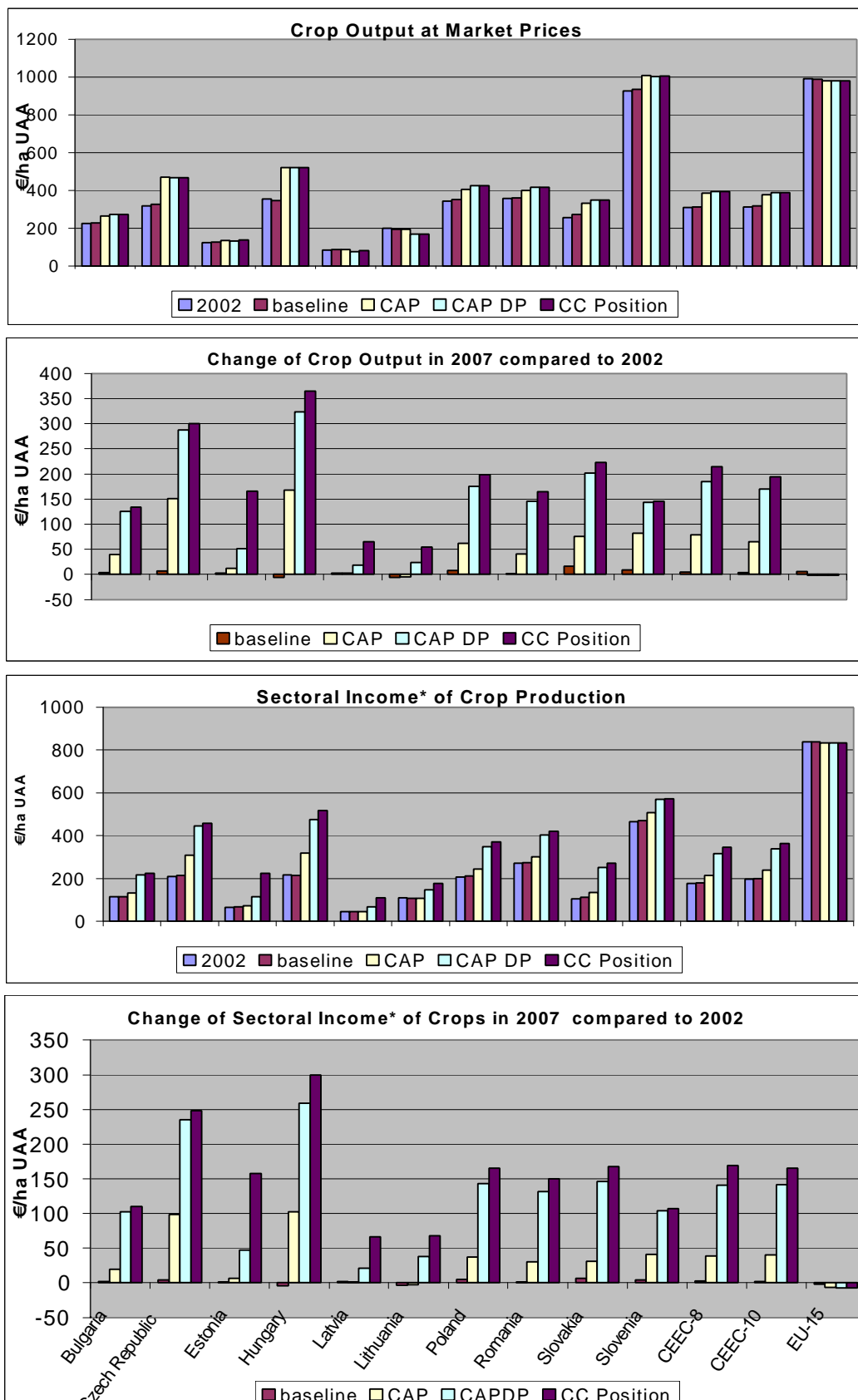
Figure 18 shows the different levels of output and sectoral income of crop production per hectare of utilised agricultural area (UAA).

In 2007 the *baseline scenario* shows a relatively stable output figure compared to 2002 across the CEECs. The value of output per hectare ranges between 100 € in Latvia and 950 € in Slovenia. On accession without direct payments (*CAP*) crop output at market prices increases between 10 € and 120 € per hectare of UAA in most countries. Only in Latvia and Lithuania is crop output projected to stagnate after accession compared to the *baseline*.

On accession, income per hectare is expected to increase between 10 €/ha to 105 €/ha, except for Latvia and Lithuania. The highest increase takes place in Hungary and the Czech Republic and the lowest in Estonia. This pattern reflects the increase of agricultural output for crops, with costs increasing accordingly. This demonstrates the ability of the crop production to be cost competitiveness in the single market.

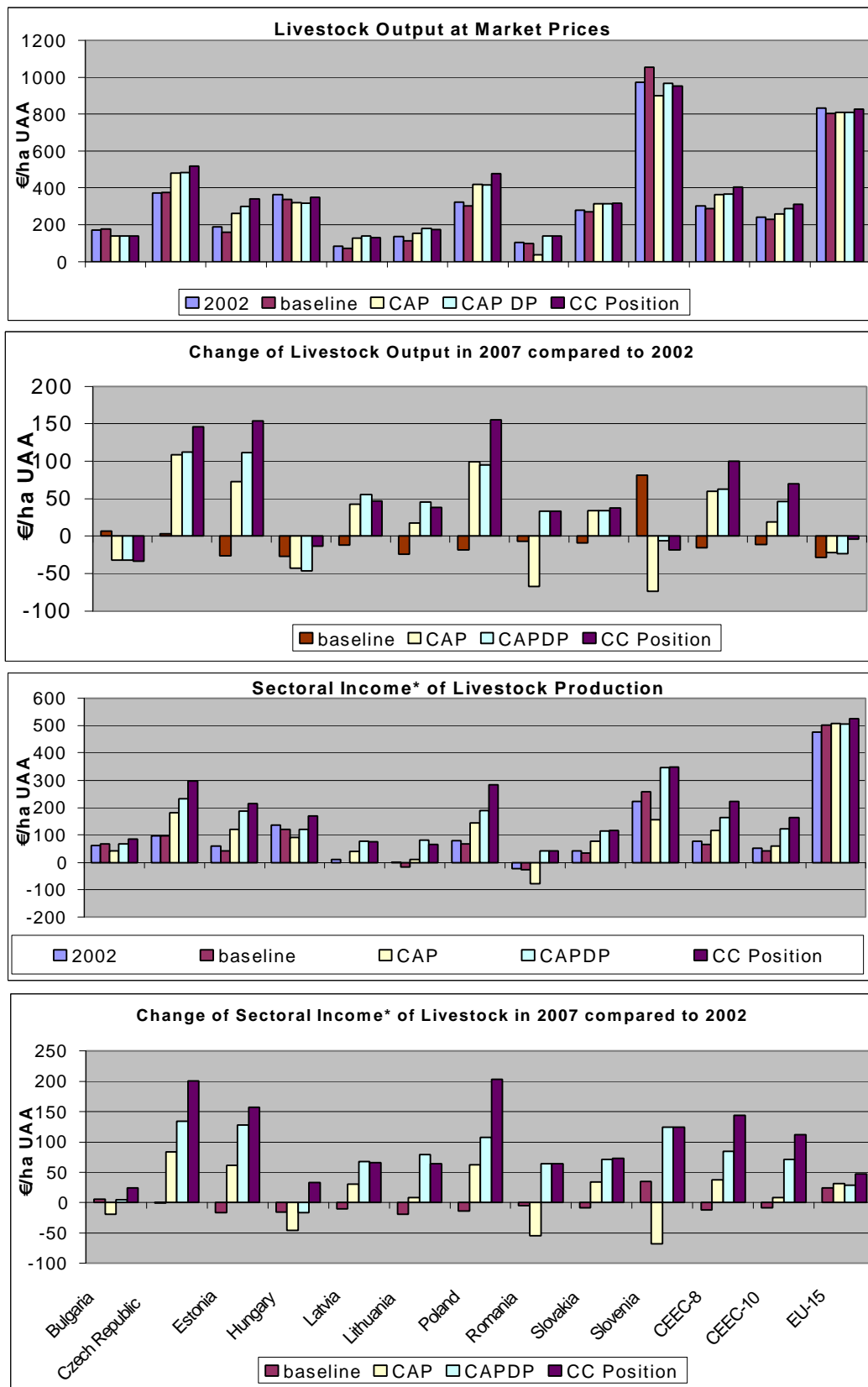
¹¹ The methodological annex includes a description of the method of simulating agricultural output and GVA.

Figure 18: Crop Output and GVA in the CEECs and the EU-15 in 2002 and under different Scenarios in 2007 (€/ha UAA)



*measured by the GVA at basic prices (including direct payments in the appropriate scenarios)
 Source: ESIM calculations and Economic Accounts for Agriculture.

Figure 19: Animal Output and GVA in the CEECs and the EU-15 in 2002 and under different Scenarios in 2007 (€/ha UAA)



* measured by the GVA at basic prices (including direct payments in the appropriate scenarios)
 Source: ESIM Simulations and Economic Accounts for Agriculture.

The positive outlook for crop production after accession is related to (i) higher prices under CAP conditions in most countries than under domestic policies and (ii) a certain intensification. However, the value of crop output per hectare still remains below EU-15 average, except for Slovenia. The lower degree of specialisation and lower intensities of production than in the EU-15 can explain a big part of these differences.

Figure 19 shows the output and income developments for the animal sector. Under domestic policies livestock output declines in most countries, except in Slovenia, the Czech Republic and Bulgaria. Following enlargement output increases on average above the levels of *baseline*, because higher prices for milk and partly for beef production in the enlargement scenarios compensate the significant decline in the value of pork production. Output decreases in Bulgaria, Hungary, Romania, and Slovenia in *CAP*. Income develops similar to that of output in *baseline* and in *CAP*.

With direct payments in *CAPDP* output increases in all countries, except Hungary. Sectoral income increases in this scenario significantly above that in *CAP* and *baseline*, except in Hungary. In *CC Position* with the quota requested by the Candidate Countries, animal output is significantly higher in most countries, due to higher larger milk and beef production in the CEECs. In Slovenia, which faces lower milk and beef prices under CAP conditions, animal output declines. Direct payments, however, would compensate the income decline in Slovenia.

The comparison of output and income developments for livestock production in the *CAP* scenario shows the low cost competitiveness of animal production in the CEECs. Despite increasing output, income only moderately expands and the gap of income per hectare between the EU-15 and the CEECs clearly widens in most countries. Another explanation for the increasing income gap per hectare is that the EU-15 is able to increase income of livestock production after accession, mainly due to lower feed costs.

Table 14 summarises the impact of the scenarios on output and income. The impact of CAP price policies and quantitative supply limits based on recent periods are therefore very positive in most countries.

- On average for the CEEC-8, crop output will rise by 25% and livestock output will increase by 20%. The benefits of CAP price support policies will be particularly felt for crops in Hungary and Czech Republic (+47%), Slovakia (+30%) and Poland (+18%). For livestock, benefits will be particularly felt in Latvia (+51%), Estonia (+39%), Poland (+31%), and Czech Republic (+29%).
- Whether candidate countries are able to fully reap these benefits will depend on their ability to meet the Acquis and produce to EU standards in the livestock sector, particularly in those countries with a large semi-subsistence sector.

These positive effects are also felt on income. The application of EU price policy is likely to see an increase in sectoral income of around 30% for the CEEC-8 in 2007 with a reduction (-4%) only in Slovenia. Increases are particularly significant in the Czech Republic (+60%), Latvia (+59%), Estonia (+55%), Slovakia (+45%) and Poland (+35%).

Table 14: Sectoral Output, Intermediate Consumption, and Income in 2007

Crop Output	2002	baseline	CAP	CAP DP	CC Position
Czech Rep.	100	102.1	147.2	147.0	147.0
Estonia	100	101.9	110.1	106.6	112.6
Hungary	100	98.2	147.3	146.7	147.4
Latvia	100	103.3	102.4	92.2	95.8
Lithuania	100	96.9	97.3	84.6	84.6
Poland	100	102.4	117.8	123.5	123.4
Slovakia	100	106.4	129.6	135.9	136.0
Slovenia	100	100.9	108.8	108.4	108.5
CEEC-8	100	101.4	125.2	127.4	127.6
Bulgaria	100	101.3	117.3	121.3	121.5
Romania	100	100.5	111.2	115.8	116.0
CEEC-10	100	101.2	120.6	123.6	123.9
EU-15	100	99.7	99.0	98.9	99.0

Livestock Output	2002	baseline	CAP	CAP DP	CC Position
Czech Rep.	100	100.8	129.2	130.1	139.2
Estonia	100	86.0	139.0	159.5	182.2
Hungary	100	92.5	88.1	87.2	96.3
Latvia	100	85.8	150.8	165.5	155.2
Lithuania	100	82.5	112.6	133.2	128.1
Poland	100	94.2	130.8	129.5	148.3
Slovakia	100	96.7	112.2	112.2	113.3
Slovenia	100	108.4	92.4	99.3	98.1
CEEC-8	100	94.7	119.7	120.7	133.0
Bulgaria	100	103.7	81.2	81.1	80.5
Romania	100	93.2	35.5	131.8	131.3
CEEC-10	100	95.2	107.8	119.1	129.1
EU-15	100	96.6	97.4	97.1	99.5

Table 14: Sectoral Output, Intermediate Consumption, and Income in 2007

Intermediate Consumption	2002	baseline	CAP	CAP DP	CC Position
Czech Rep.	100	101.6	119.9	120.0	121.2
Estonia	100	95.2	109.3	112.4	125.2
Hungary	100	96.2	118.6	117.6	122.3
Latvia	100	99.5	111.1	102.1	110.2
Lithuania	100	96.8	102.7	94.9	98.9
Poland	100	99.6	116.1	117.7	121.5
Slovakia	100	102.2	111.5	113.9	114.1
Slovenia	100	104.2	102.9	103.5	103.4
CEEC-8	100	99.2	119.9	120.2	124.8
Bulgaria	100	101.1	102.8	104.6	104.6
Romania	100	98.9	98.3	109.0	109.2
CEEC-10	100	99.3	114.8	117.3	120.7
EU-15	100	97.7	97.1	97.1	97.4

Sectoral Income*	2002	baseline	CAP	CAP DP	CC Position
Czech Rep.	100	101.2	159.6	220.7	246.4
Estonia	100	88.1	154.8	241.0	353.5
Hungary	100	94.4	116.1	168.6	194.3
Latvia	100	84.2	159.1	265.2	343.6
Lithuania	100	79.4	105.1	205.9	218.4
Poland	100	96.9	134.7	187.7	228.7
Slovakia	100	99.1	144.6	247.9	264.4
Slovenia	100	105.7	96.1	133.1	133.5
CEEC-8	100	96.2	130.1	188.6	223.2
Bulgaria	100	104.0	100.3	161.2	176.5
Romania	100	98.6	90.2	178.9	186.1
CEEC-10	100	97.4	119.7	185.7	211.6
EU-15	100	101.7	101.8	101.6	103.1

* at GVA at basic prices (including direct payments in the appropriate scenarios)

The application of direct payments on the basis of recent reference periods triples this effect (+89%), while the candidate countries negotiating positions quadruples the effect (+123%).

The development of income per person employed in agriculture exhibits a similar pattern than GVA per hectare. On average, accession leads to an increase of the income per person employed in agriculture. However, the income increase per person employed in agriculture due to accession is the highest in the Czech Republic, Slovakia, and in Hungary – with a comparable low share of agricultural employment – and the lowest in Latvia, Lithuania, Poland, Bulgaria, and Romania - with a high share of agricultural employment. Compared to the EU-15 the gap of income per person employed in agriculture remains high, despite accession and despite the introduction of the CAP.

The differences of agricultural income between the EU-15 and the CEECs after accession are closely related to the differences in alternative income of the production factors land, capital and especially labour in the economy as a whole (opportunity costs). The costs of land and labour are generally higher in the EU-15 than in the CEECs, while the costs of capital¹² are lower in the EU than in the CEECs. These characteristics contribute to determine different patterns of production and they should be taken into account when levels of agricultural income between countries are compared.

Even low levels of income per hectare may sufficiently reward the production factors in agriculture, if levels of remuneration in the rest of the economy are equally low. In countries with high opportunity costs of production factors, e.g. high wages in the rest of the economy, agricultural income has also to be high to produce a viable remuneration.

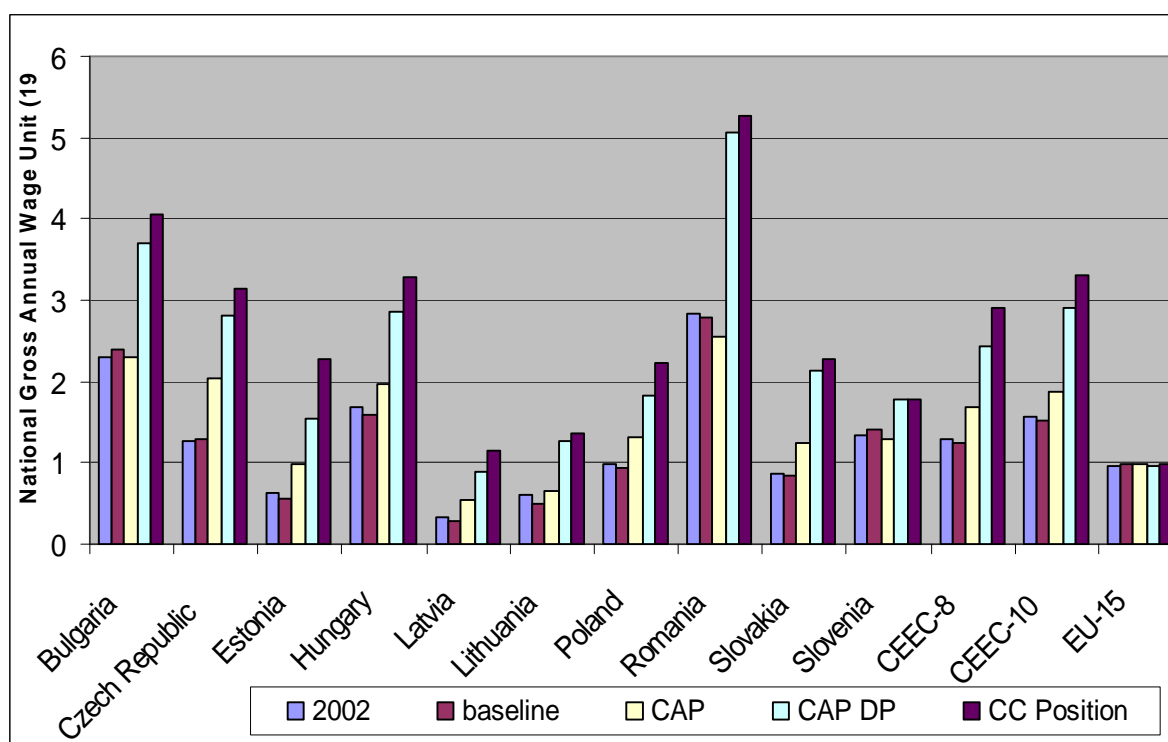
All these income comparisons are affected by the over-employment in agriculture existing in some CEECs. In order to facilitate the comparison of income level between countries, country specific hypothetical 20 hectare farms have been constructed for all Candidate Countries and the EU-15.¹³ The income of these farms, measured by the GVA (including direct payments), is then compared to an average annual national wages per person employed outside agriculture (Figure 20).

However, one should note that the income measure GVA per farm would be used to pay all the production factors including land, fixed capital, as well as family and hired labour. The comparison of GVA with average annual gross wages is just a rough measurement for relative income of a farm. However, in the specific situation of some CEECs, where land values generate low income for land owners and capital stocks on the farm are largely depreciated, the owned production factors of a family farm just serve the remuneration of labour. Even in large scale operations the income serves mainly to remunerate labour. Under these conditions the main reference of a farmer to stay in agriculture is the alternative labour income.

¹² The costs of capital include interest rates but also and more importantly the transaction costs to obtain capital for investments on farms. The latter are especially high in countries with small-scale agriculture and in those countries where agricultural collateral is low.

¹³ The hypothetical farms represent the country specific production structure of the whole agricultural sector.

Figure 20: Relative Income* of a 20 ha Farm in 2002 and 2007 (GVA/gross average annual wage)



* GVA in basic prices including direct payments.

In 2002 under current policy conditions an average 20 hectare is estimated to produce added value worth one average annual gross wage in the Czech Republic, Hungary, Poland, Slovenia, and also more or less so in Slovakia. Low income in the rest in the economies in Bulgaria and Romania leads to the fact that a 20 hectare farm would generate 2 to 3 times more income compared to an average wage outside agriculture. However, a 20 hectare farm would produce significantly less income in the Baltic countries, which combine low productivity (Latvia and Lithuania) with relatively high agricultural prices or high productivity with low prices (Estonia). Compared to the situation in the CEECs, a 20 hectare farm in the EU-15 produces roughly one average annual gross wage.

Under the assumption that wages outside agriculture remain constant in real terms, domestic policies projected to 2007 (*baseline*) lead to a reduction of relative income for a number of countries, especially when exchange rate appreciation leads to further pressure on agriculture. Only the Czech Republic and Slovakia develop positively because the technical progress is projected to outweigh the exchange rate pressures due to the expected stable macroeconomic development.

Enlargement, even without direct payments, would lead to an improvement of the income situation in most of the countries. Only Romania with a grossly non-competitive livestock sector and Slovenia, which faces declining agricultural prices, see a fall in income on accession without direct payments. However, a 20 hectare farm in Slovenia generates more than one comparable wage equivalent outside agriculture and the income losses due to the alignment to CAP prices are comparably small.

The granting of direct payments under *CAP DP* would lead to a further improvement of the income situation of a 20 hectare farm such that agricultural income in most countries

exceeds average wages outside agriculture. In Poland the hypothetical farm would yield almost 2 national wages instead of 1.25 wage units without direct payments in *CAP*. In Hungary and the Czech Republic full direct payments leads to an income increase from the equivalence of 2 national wages in *CAP* to 3 national wages in *CAP DP*. Relative incomes of a 20 hectare farm would increase extremely in low-income Bulgaria and Romania.

In conclusion, accession without direct payments leads to favourable income increases in the CEEC-8, where accession without direct payments would increase the income of a 20 hectare farm by the equivalent of 0.6 wages from 1.2 wages in *baseline* to 1.8 wages after accession in *CAP*. Full direct payments based on recent reference periods (*CAP DP*) increases incomes by further 0.8 wages to 2.6 average annual gross wages. With direct payments based on the requests of the CEECs (*CC Position*) income increases roughly by 1.2 wages to 3 national wages compared *CAP*. The application of full direct could result in some countries in a large income increase relative to the national wage level. This could support arguments about increasing inequalities in rural areas. In such a situation it is favourable for labour, to stay in agriculture instead of seeking employment outside agriculture.

7. CONCLUSIONS FOR AGRICULTURAL MARKETS IN THE ENLARGED UNION

EU agricultural markets represent community wide institutions, i.e. balancing effects appear between regions with surpluses and those with deficits. Moreover, prices are able to adjust on the single market to react to supply and demand changes, but are constrained by agricultural price and trade policies, which aim at stabilising internal prices. To assess the effects of accession on agricultural markets correctly, the perspective of accession has been widened from the CEECs to the enlarged EU.

With the integration of the CEECs cereal production in 2007 reaches levels of 312 Mill. t. to 315 Mill. t, compared to 221 Mill. t in the EU-15. The EU-25 further increases cereal production to 320 to 330 Mill. t by 2012. Domestic use in the EU-25 continues to modestly expand in the period in question for all accession scenarios from levels of 271 to 274 Mill. t in 2007 to 277 to 279 Mill. t. in 2012. Marketable surpluses of the EU-25 in 2007 reaches levels of 41 Mill. t compared to 24 Mill. t in the EU-15 without accession. The surplus increases to levels of 43 Mill. t and 51 Mill. t in 2012.

In 2012 the market surpluses of the EU-25 consist mainly of wheat (23 Mill. t to 29 Mill. t), barley (12 Mill. t) and rye (7 Mill. t to 10 Mill. t). The EU-25 continues to have a market deficit for maize of approximately 2 Mill. t and continues to have market surpluses of other grains of around 2.3 Mill. t.

The surpluses of wheat should not cause a major problem in view of the fact that wheat should be competitive on world markets without export refunds. Barley exports are very sensitive to changes of the exchange rate – a further revaluation of the EURO against the USD than foreseen in the scenarios quickly leads to higher needs for export refunds. The maize surplus of the CEECs could be entirely absorbed by the EU-15. Only rye and other grains (mainly oats) prove to be non-competitive on world markets. The high amount of rye market surplus could create a serious problem, such that intervention stocks would have to play a dominant role in long-term marketing of this cereal.

These general developments mask some of the balancing effects of the single market. As a result of accession, two effects occur on EU-25 cereal markets. Firstly, cereal prices

adjust to the new market surplus situation, and, secondly, livestock production increases in the EU-15. Production of pork is approximately 1 Mill. t higher than without accession, whereas poultry production is slightly smaller than baseline but continues to expand strongly afterwards and to benefit from the expanding markets in the new Member States.

As a result feed demand in the EU-15 expands by around 5 to 6 Mill. t. The production of cereals decreases by 1 to 3 Mill. t. due to price adjustments after accession. Therefore, market surpluses of the EU-15 drop by 4 to 9 Mill. t compared to non-accession in *baseline*. The expansion of marketable cereal surpluses in the EU is less than the sum of individual market surpluses of current and new Member States, without the effects of the single market. The analysis also shows that integration into the single market will provoke a certain specialisation of agricultural production into crop production in the CEECs and livestock production in the EU-15.

Beef markets in the EU-25 prove to be flexible enough if consumption returns to normal levels and no major change of consumer preferences occur. The marketable surplus of beef in the CEECs causes a decline of beef prices on the single market which, on the one hand, expands consumption in the EU-15 by 0.02 to 0.1 Mill. t compared to the *baseline* of 7.54 Mill. t in 2007 and on the other hand reduces production by 0.05 Mill. t to 0.19 Mill. t in the EU-15. Even the higher market surplus of 0.37 Mill. t in *CC Position* is then fully absorbed on the single markets that total market surpluses of the EU-25 do not exceed this level.

Following the CAP reforms, consumption of fresh dairy products and cheese increases and dairy production adjusts to this more profitable section of the markets. Despite this fact surpluses for butter grow. As a result butter and skimmed milk powder prices remain at the effective intervention price level. The price for cheese is also lower in the accession scenarios, because the CEECs shift dairy production to cheese rather than to the bulk products. As a result, average milk prices in the EU-25 are around 6 to 20 €/t lower than without accession. The highest price decrease would take place under the higher milk quotas requested by the Candidate Countries.

For the high value added part of the dairy market, e.g. cheese and fresh dairy products, production increases in the EU-15 due to accession but also expand in the CEECs.

In conclusion, dairy markets in the enlarged Union as a whole further specialise towards high value added products. However a certain specialisation of the CEECs on bulk dairy products remains visible in the early phase after accession. In the longer run, however, the new Member States will also benefit from this development and further diversify their dairy production structure towards high value added dairy products but with a certain time lag. These results could be less positive, if CEEC dairy industries fail to restructure and, thus, would largely be more competitive for bulk products. This would increase the pressure on these markets in the EU-25. However, the results suggest that quotas based on recent reference periods would not lead to major disturbances of EU dairy markets after accession.

Accession leads to favourable income increases in the CEEC-8 (the CEECs without Bulgaria and Romania), where accession without direct payments would increase the income of a 20 hectare farm by the equivalent of 0.6 wage units from 1.2 wage units before accession to 1.8 wage units after accession. Full direct payments based on recent reference periods (*CAP DP*) increases income by the equivalent of further 0.8 wage units to 2.6 national wage units. With direct payments based on the requests of the CEECs (*CC-Position*) income increases roughly by 1.2 wages units to 3 wage units compared to

the situation without direct payments. The application of full direct could result in some countries in a large income increase relative to the national wage level. This could support arguments about increasing inequalities in rural areas. In such a situation it is favourable for labour, to stay in agriculture instead of seeking employment outside agriculture.

Accession of the CEECs to the EU would not lead to new challenges on markets of an enlarged EU, it just accentuates the existing ones, which is the case, for example for coarse grains. The increasing specialisation of agricultural production displayed in the simulations results is of mutual benefit as countries are allowed to benefit from their special patterns of competitiveness. Restructuring remains one of most important challenges for most of the CEECs' agricultural sectors under CAP conditions, especially in livestock production.

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9. ANNEX 1: METHODOLOGICAL NOTES

Accession of the CEECs to the EU fundamentally affects the economics of CEECs' agricultural markets. The CAP introduces new instruments to the new members, which

change the level of protection as well as the price transmission from world to domestic markets. Although agricultural markets are then generally more shielded from influences of world markets, agriculture is indirectly exposed to the competition of the Single European Market once the applicants are fully integrated into the customs union of the EU. All these effects alter levels as well as relations of agricultural prices.

Policy options for CEEC-EU agricultural accession are evaluated with a partial equilibrium model. This European Simulation Model (ESIM) was developed by the USDA/ERS in co-operation with Josling and Tangermann and first used in Tangermann and Josling (1994). Thereafter, the development of ESIM followed different paths: The USDA/ERS developed ESIM further for the purpose of pursuing forecasts and policy analysis for numerous countries covered in their Production, Supply and Demand Database.

On the European side, ESIM has been further developed in Tangermann and Münch (1995), Münch (1995) and expanded in country coverage by Münch (1997), adapted in structure to run with key variables produced by CGEs (Münch, 2000). For the present analysis the Model has been further developed within DG Agriculture with respect to the commodity structure, modelling of policies, the ability to carry out short and long-term forecasting and with respect to the phenomenon of subsistence production and consumption of milk in the CEECs.

Annex 1 describes the structure of the model and summarises recent developments of the ESIM model undertaken for the purpose of quantifying EU accession effects. The first part describes the structure of the model. The other parts refer to the economic mechanisms as well as welfare and budgetary calculations in detail. The chapter concludes with a comparison with other partial equilibrium models.

The analysis of CEEC accession to the EU focuses on the effects on agricultural markets and government expenditure of introducing the CAP in CEEC. The CAP market regimes consist of sophisticated sets of instruments, which are designed to elevate domestic prices above world market levels and at the same time to contain production by supply control. Moreover, as the market price support declines, direct payments for area and cattle gain importance. Regarding the importance of the expected effects on CEEC markets during accession, the modelling effort concentrates upon the representation of CAP policies in a model with sufficient commodity and country detail. On the other hand, the modelling of behaviour is pragmatic and relies on proven concepts.

ESIM is a price and policy driven comparative static agricultural world model with rich cross-commodity relations and the possibility to model price and trade policy instruments in great detail. It is a partial equilibrium model, i.e. macroeconomic variables (income, exchange rates) are exogenous. As a world model it includes all countries, though in greatly varying degrees of disaggregation. Typically one chooses between countries which are explicitly modelled and others which are combined in an aggregate: the so-called rest of the world (ROW). The model used for the analyses presented in this study includes ten CEEC (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia) and the EU-15. All other countries are aggregated as the ROW. The agricultural sector is modelled with 15 agricultural commodities, 9 processed goods and 6 other commodities and production factors (see Table A1-1).

Table A1-1: Commodities in ESIM

Agricultural commodities	
Crops	wheat, barley, corn, rye, other grains, rape seed, sunflower seed, soybeans, sugar
Livestock	milk, beef and veal, pork, poultry, eggs
Feeds	manioc, corn gluten feed
Processed commodities	
Oils and cakes	rape seed oil and cake sunflower seed oil and cake soybean oil and cake
Dairy	butter, skimmed milk powder, cheese
Others	
Factors and inputs	labor, capital, non agricultural intermediates, feeds
Residual tradable feeds	other energy rich feeds, other protein rich feeds
Residual consumer goods	other commodities

Source: Own compilation.

Table A1-2 summarises the general form of the major equations for supply, demand and processing as well as price transmission.

Supply activities in ESIM are modelled for agricultural commodities as well as for selected processed goods. Crop and livestock supply functions are separated into two parts: a capacity (area, herd) and a yield part. This basically assumes separable supply activities. Equations 1 to 3 describe crop supply, which depends on prices, costs, policies and technical progress. A similar system exists for livestock supply in equations 4 to 6.

Table A1-2: Modelled Activities**I. Supply in country c**

(1) crop area	$EA_{cr,c} = f(PP_{cr,c}, EDP_{cr,c}, capc_c, wagc_c, sa_c, ta_c)$
(2) crop yield	$Y_{cr,c} = f(PP_{cr,c}, intc_c, sa_c, tp_{cr,c})$
(3) crop supply	$S_{cr,c} = EA_{cr,c} \cdot Y_{cr,c}$
(4) livestock herd	$H_{lvst,c} = f(PP_{lvst,c}, EDP_{lvst,c}, capc_c, wagc_c)$
(5) livestock yield	$Y_{lvst,c} = f(PP_{lvst,c}, FC_{lvst,c}, tp_{lvst,c})$
(6) livestock supply	$S_{lvst,c} = H_{lvst,c} \cdot Y_{lvst,c}$
(7) Rest of the World	$S_{i,ROW} = f(PW_{i,ROW}, tp_{i,ROW})$

II. Demand in Country c

(8) human demand	$DH_{i,c} = f(PD_{i,c}, ginc_c, gpop_c)$
(9) feed demand	$DF_{i,c} = f(PDi_{i,c}, S_{lvst,c}, tpf_{f,lvst,c})$
(10) seed demand	$DS_{cr,c} = f(EA_{cr,c})$
(11) processing demand	$DC_{proc,c} = f(PDi_{i,c}, PD_{proc,c}, cs_{i,c})$
(12) total domestic use	$DT_{i,c} = DH_{i,c} + DF_{i,c} + DS_{i,c} + DC_{i,c}$

III. Processing of oilseeds and milk

(13) processing supply	$S_{proc,c} = f(DC_{proc,c})$
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IV. Trade

(14) net exports	$NX_{i,c} = S_{i,c} - DT_{i,c}$
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IV. Domestic Price Transmission

(15) wholesale prices	$PD_{i,c} = f(PW_i, pol_{i,c}, maxex_{i,c}, er_c, NX_{i,c})$
(16) producer prices	$PP_{i,c} = f(PD_{i,c}, mm_{i,c})$
(17) effective producer prices	$PPE_{q,c} = f(PP_{i,c}, qu_{i,c})$

V. Closure Rules

(18) world markets (tradables)	$\sum_c NX_{it,c} \approx 0$
(19) domestic markets (non-tradables)	$NX_{nt,c} \approx 0$

Sets:	List of variables:	List of parameters:
countries: c	<i>FC</i> index feed costs	<i>capc</i> capital cost index
products: i	<i>DF</i> total demand for feed	<i>cs</i> capacity shifter for processing
crops: cr ∈ i	<i>DH</i> human demand	<i>er</i> real exchange rate domestic/US\$
feed: f ∈ i	<i>DC</i> processing demand	<i>inc</i> income (index)
livestock: lvst ∈ i	<i>DS</i> seed demand	<i>pop</i> population (index)
processed goods: proc ∈ i	<i>DT</i> total domestic use	<i>intc</i> cost index non ag. intermediates
tradables: it ∈ i	<i>EA</i> effective area	<i>mm</i> marketing and processing margin
non-tradables: nt ∈ i	effective direct payments	<i>maxex</i> maximum net exports
	EDP	
quota products: q ∈ i	<i>H</i> herd	<i>pol</i> trade and price policies
	<i>NX</i> net exports	<i>qu</i> supply quota
	<i>PD</i> domestic price	<i>sa</i> effective set-aside
	<i>PP</i> producer price	<i>ta</i> total area
	<i>PPE</i> effective producer price	<i>tp</i> supply shifter
	<i>PW</i> world market price	<i>tpf</i> shifter feeding efficiency
	<i>S</i> supply	<i>wagc</i> wage index
	<i>Y</i> yield	

Source: Münch (2000).

Apart from effective producer prices or shadow prices (PPE), costs are a major determinant for supply. Costs are separated into components related to capital (capc) and labour (wagc) as well as non-agricultural intermediates (intc). Feed costs (FC) are the only endogenous cost component of the model. These factors and inputs represent tradable (FC, capc) and non-tradable (wagc) components. The effects of changes of relative prices between tradable and non-tradable factors and inputs on agricultural supply can be analysed, as they may happen with shifts in the real exchange rate. This is an especially important issue in transition economies (see Macour and Swinnen, 1997).

In economies in transition, macroeconomic equilibrium conditions are subject to rapid change, the more so with integration into the EU. Therefore, key macroeconomic indicators are affected, i.e. exchange rates, costs and incomes.

Total domestic use (DT) consists of human demand (8), feed demand (9), processing demand (11) and seed demand (10). While the latter is a transformation of the effective area (EA), the other domestic use components are directly modelled.

Processing involves oilseeds and milk as raw materials. Purchase and distribution of raw material among the processing activities are described in (11) which depends on prices of raw materials and processed commodities.

Price and trade policies influence the price transmission from world to domestic markets in equation 15. Direct payments and supply quotas directly affect supply. These instruments are closely modelled to actual EU regulations as well as those proposed for the CAP. Table A1-3 summarises the different policy instruments modelled for the commodities.

Table A1-3: CAP Policy Instruments in ESIM

	Price policies	Trade policies	Supply management	Income policies
Cereals	minimum price	variable export subsidies variable export tax variable import tariffs	obligatory set-aside	direct payments coupled to area
Oilseeds			obligatory set-aside	direct payments coupled to area
Sugar	minimum price	import tariffs	quota	
Milk			quota	direct payments
Dairy products	minimum price	variable export subsidies import tariffs		
Beef and veal	safety net price	maximum export quantities import tariffs		direct payments coupled to beef cattle
pork, poultry, eggs		maximum export quantities import tariffs		
Other products		tariffs		

To better incorporate price and trade policies four different prices are defined for two price levels: world market (PW) and domestic market prices (PD) are wholesale prices. This price level is relevant for domestic use and processing. Moreover, the CAP trade and price policy instruments actually apply at this level. The producer or farmgate price (PP) is derived in equation 16 from PD by deducting the marketing and processing margin. The farmgate price, therefore, depends on the transaction costs of the downstream sector. The fourth price in equation 17, the effective producer price (PPE) or shadow price, incorporates the effects of quota regimes for sugar and milk.

The activities in the fully modelled countries are formulated in detail especially for agricultural products. In ROW, however, activities are simplified. While this part is also price driven, supply is modelled through direct functions, consequently neglecting area, herds and yields. Moreover, policies are of limited specificity. The model, therefore, has only restricted abilities to project agricultural activities on the global scale, though it is capable of identifying the effects of European agricultural policies on world markets.

Foreign trade is the residual of domestic supply and total domestic use, i.e. trade flows are net figures.¹⁴ Following a common approach well established in literature, the model is solved numerically for the equilibrium prices on world markets (e.g. Roningen and Dixit, 1989). The equilibrium condition for tradables is world market clearing, i.e. the sum of all net exports of the i^{th} commodity over the countries has to be very close to zero. For non-tradables, domestic markets require to clear (see equation 16 and 17). The vector of equilibrium world market prices, therefore, simultaneously clears aggregated supply and demand. The solving algorithm calculates world market prices in response to the changes of aggregated net exports for the i^{th} product. In order to distinguish between small and big agricultural world markets, i.e. determining the size of the necessary price change, net exports are set in relation to world production in the base.

Changes of domestic policies alter world market prices to different degrees, which depend on the share of a particular country in world net exports. Therefore, a policy change in a small country in agricultural terms such as Slovenia alters world market prices less than a new policy in a big countries like the EU-15. Nevertheless, even policies in small countries like Slovenia affect world market prices.

In the absence of policies and market distortions, domestic prices equal world market prices. Price and trade policies, however, drive wedges between world market and domestic prices. Additionally, they decouple domestic from world market prices to different degrees. Therefore, domestic price levels as well as development of price ratios differ from those on world markets.¹⁵

Another important aspect is the development of real exchange rates. These affect relative prices in two main ways: firstly, in the event of price and trade policy instruments being defined in monetary terms (e.g. intervention prices, specific tariffs), the gap between domestic and world market prices alters. Secondly, they change relative prices of tradable and non-tradable commodities and factors.

Simulation of Agricultural Output and GVA

¹⁴ Gross trade models, such as most CGEs, relax this assumption by distinguishing between domestic and exportable goods via the Armington approach (see Banse, 1997a).

¹⁵ Which in return also affects world market prices.

The estimation of agricultural output and Gross Value Added (GVA) combines the model simulations with the statistics of the Economic Accounts for Agriculture. The estimates include all agricultural products. The selection of products in ESIM represents the main commodities benefiting from internal price support and/or export refunds. The commodities not covered by ESIM usually are very diversified in terms of products as well as of qualities, i.e. fruits, vegetables and wine. Their prices depend rather on quality, consumer preferences as well as transport and handling costs than on support measures. Already prices in the CEECs for these commodities are very close to those in the EU-15, if comparable qualities are taken into account. Therefore, it cannot be expected that aggregate prices for fruits, vegetables and wine will change significantly with accession. Though prices of other products, represented in ESIM, may change significantly.

For the components not presented by the model, additional assumptions regarding production and developments of costs have been taken. Most notably that technologies remain constant and that expansion of production requires higher use of production factors and inputs. Prices of tradable inputs such as energy, fertilisers and pesticides depend also on the development of real exchange rates.

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10. ANNEX 2: THE ROLE OF AGRICULTURE IN THE CANDIDATE COUNTRIES AND THE EU15

MEMBER STATES & APPLICANT COUNTRIES - MAIN ECONOMIC INDICATORS											
	AREA Km ²	POPULA-	DENSITY inhab / Km ²	GDP in PPS ⁽¹⁾ (EUR)		PPS ⁽¹⁾ / capita EU15 = 100	Real GDP annual % change				
		TION		Mio	per		1999	2000	2001	2002	
		end of period (000)		PPS ⁽¹⁾	capita PPS ⁽¹⁾						
2001			2000								
Cyprus	9,251	677	73	12,948	19,400	86.1	4.5	4.8	4**	3.3**	
Czech Rep.	78,870	10,275	130	135,549	13,200	58.6	-0.4	2.9	3.5**	3.8**	
Estonia	45,223	1,361	30	12,413	8,600	38.2	-0.7	6.9	5.3**	4.7**	
Hungary	93,030	9,973	107	115,061	11,500	51.0	4.2	5.2	3.8**	3.2**	
Latvia	64,599	2,351	36	15,959	6,700	29.7	1.1	6.8	7.9**	4.5**	
Lithuania	65,300	3,681	56	27,578	7,500	33.3	-3.9	3.9	4.5**	3.5**	
Malta	316	384	1217	4,921	12,600	55.9	4.1	5.4	2.4**	3.3**	
Poland	312,690	38,629	124	342,104	8,900	39.5	4.1	4.0	1.5**	1.9**	
Slovakia	49,030	5,403	110	58,087	10,800	47.9	1.9	2.2	2.7**	3.5**	
Slovenia	20,270	1,995	98	31,032	15,600	69.2	5.2	4.6	3.7**	3.3**	
CC- 10	738,578	74,729	101	755,652	10,100	44.8	3.0	4.0	2.7e	2.8e	
Bulgaria	110,990	8,107	73	51,395	6,300	28.0	2.4	5.8	4.2**	3.6**	
Romania	238,399	22,390	94	117,311	5,200	23.1	-2.3	1.6	4.6**	4.4**	
CC- 12	1,087,967	105,226	97	924,358	8,800	39.1	2.5	3.9	2.9e	2.9e	
CEEC- 10	1,078,401	104,165	97	906,489	8,700	38.6	2.5	3.9	2.9e	2.9e	
EU-15	3,235,394	379,449	117	8,524,943	22,530	100	2.6	3.3	1.6	1.4	
Belgium	30,528	10,292	337	246,485	24,060	106.8	3.0	4.0	1.3	1.3	
Denmark	43,094	5,367	125	145,274	27,220	120.8	2.3	3.0	1.3	1.6	
Germany	357,030	82,360	231	1,951,670	23,740	105.4	1.9	3.0	0.6	0.7	
Greece	131,957	10,596	80	164,496	15,580	69.2	3.4	3.8	4.1	3.5	
Spain	505,990	40,428	80	742,236	18,590	82.5	4.1	4.1	2.7	2.0	
France	549,087	59,344	108	1,350,515	22,350	99.2	2.9	3.1	2.0	1.5	
Ireland	70,295	3,873	55	101,066	26,690	118.5	10.9	11.5	6.5	3.3	
Italy	301,318	58,018	193	1,331,282	23,060	102.4	1.6	2.9	1.8	1.3	
Luxembourg	2,588	447	173	19,553	44,300	196.6	6.0	7.5	4.0	3.0	
Netherlands	41,530	16,101	388	413,454	25,970	115.3	3.7	3.5	1.5	1.5	
Austria	83,858	8,140	97	202,701	24,990	110.9	2.8	3.0	1.1	1.2	
Portugal	91,906	10,303	112	165,657	16,550	73.5	3.4	3.4	1.7	1.5	
Finland	338,150	5,195	15	119,956	23,180	102.9	4.1	5.6	0.5	1.8	
Sweden	449,974	8,910	20	203,604	22,950	101.9	4.5	3.6	1.4	1.6	
United Kingdom	244,101	60,075	246	1,366,994	22,896	101.6	2.1	3.0	2.3	1.7	
Latest Update 06/03/2002											
e = estimate, **= DG ECFIN											
SOURCES: DG AGRI A2, EUROSTAT, OECD, FAOSTAT						(1): Purchasing Power Standard (Source: EUROSTAT)					

MEMBER STATES & APPLICANT COUNTRIES - THE ROLE OF THE AGRICULTURAL SECTOR

	AGRICULTURAL AREA		GROSS VALUE ADDED OF AGRICULTURE (2)		AGRICULTURAL EMPLOYMENT (2)		TRADE OF AGRICULTURAL PRODUCTS (4)		Bilateral Agricultural Trade(CC's- EU & EU-CC's)		FOOD EXPENDITURE
	UAA ⁽³⁾ (000 Ha)	% total area	Mio EUR	Share of Agric. in GDP	Agric. employment (000)	as % of total employment	% total exports	% total imports	% of agric. export	% of agric. imports	% of total expenditure
	2001		2000		2000		2000				1999
Cyprus	134c	14.5	348.8b	4.2b	14b	9.2b	27.9	12.4	68.3	62.7	18.6
Czech Rep.	4,280	54.3	1,996	3.9	193	5.2	4.5	5.8	38.7	48.5	32.2
Estonia	986c	21.8	309	6.3	32	7.4	4.3	10.3	37.5	55.1	35.7
Hungary	5,853	62.9	1,816	4.1	227	4.8	8.0	3.6	47.1	51.8	42.1a
Latvia	2,540c	39.3	314	4.5	118	13.5	5.4	13.4	37.2	44.6	38.7
Lithuania	3,489	53.4	832	7.5	262	19.6	11.4	10.5	35.4	41.9	39.8
Malta	12c	38.0	77	2.3	2.7b	1.9b	2.8	10.0	23.3	69.9	:
Poland	18,397	58.8	4,984	3.3	2,698	18.8	8.4	6.7	44.5	53.9	29.5
Slovakia	2,444	49.8	847	4.5	119	6.7	3.5	6.4	22.8	40.1	31.8a
Slovenia	486c	24.0	560	3.2	81	9.9	4.5	6.8	24.0	51.3	24.0
CC- 10	38,620	52.3	12,083	3.8	3,747	14.3	6.5	6.4	41.6	51.2	34.8e
Bulgaria	5,498	49.5	1,673	14.5	342b	11.3b	10.5	6.2	33.5	46.4	53.5a
Romania	14,874	62.4	4,564	12.6	4861b	42.8b	3.6	7.6	48.6	33.8	58.0a
CC- 12	58,993	54.2	18,320	5.0	8,950	22.1	6.4	6.5	41.4	49.5	44.8e
CEEC- 10	58,847	54.6	17,894	5.1	8,933	21.4	6.3	6.4	41.0	47.1	37.1e
EU-15	130,004	40.2	167,544	2.0	7,129	4.3	6.2	5.7	12.5	9.9	17.4
Belgium	1,389	45.5	3,118	1.3	79	2.0	5.4	6.8	13.2	5.2	17.1
Denmark	2,656	61.6	3,847	2.2	99	3.6	21.0	7.9	7.6	10.3	17.9
Germany	17,067c	47.8c	22,000	1.1	962	2.5	3.1	4.8	23.8	19.8	15.7
Greece	3,901	29.6	8,190	6.7	651	16.7	20.4	4.7	39.1	17.9	21.3
Spain	25,136	49.7	20,232	3.3	1,027	6.6	10.1	7.9	13.7	3.9	18.7
France	29,784c	54.2c	36,592	2.6	1,032	4.4	8.4	4.4	5.2	6.7	17.8
Ireland	4,418b	62.8b	2,952d	2.9d	127	7.5	8.2	3.1	7.7	3.0	18.2
Italy	15,397c	51.1c	29,992	2.6	1,105	4.8	5.0	6.2	12.0	11.1	17.5
Luxembourg	127	49.2	133	0.7	4	1.6	1.0	2.0	8.5	0.5	18.2c
Netherlands	1,976	47.6	9,708	2.4	284	3.5	16.3	8.7	11.8	4.8	14.8
Austria	3,407c	40.6c	4,060	2.0	543	13.4	3.4	3.8	39.9	57.3	15.2
Portugal	3,824	41.6	3,760	3.3	535	10.9	8.4	11.2	0.9	3.0	27.0a
Finland	2,212	6.5	4,252	3.2	142	6.2	3.1	3.1	16.0	11.6	18.6
Sweden	2,990	6.6	3,893	1.6	116	2.7	2.6	3.7	11.0	11.5	16.8
United Kingdom	15,720c	64.4c	14,622	0.9	426	1.5	5.2	5.2	7.7	4.7	17.6
a = 1998, b = 1999, c = 2000, e = estimate, p = provisional, : = n.a.											
SOURCES: DG AGRI A2, EUROSTAT, DG ECFIN, OECD, FAOSTAT				(1): Purchasing Power Standard (Source: EUROSTAT)							
				(2): Including Forestry, Hunting and Fishing sector							
				(3): Utilized Agricultural Area							
				(4): All Agricultural Products - less fish and fish products but incl. UR products.							

11. ANNEX 3: MODEL RESULTS

Please note that in each table presented in Annex 3 the line “Total EU” includes the EU as simulated in the scenarios. In *baseline*, which assumes unchanged national policies and non-accession, “Total EU” is always EU-15. In the other three accession scenarios “Total EU” represents the EU-27.

Table A3-1: EU and CEEC Market Balance for Total Cereals under different Scenarios (Mill. t)

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	208.02	221.20	217.82	217.58	217.77	226.91	223.96	223.55	223.71
CEE-10	75.10	83.42	92.23	97.00	97.20	86.78	92.63	99.33	100.24
EU-25	(283.12)	(304.62)	310.05	314.59	314.97	(313.69)	316.59	322.88	323.95
domestic use									
human demand									
EU-15	59.73	64.11	64.61	64.69	64.66	66.03	66.43	66.53	66.52
CEE-10	20.94	21.45	19.91	20.03	20.07	21.51	21.27	21.28	21.28
EU-25	(80.67)	(85.56)	84.52	84.72	84.73	(87.54)	87.70	87.81	87.80
feed demand									
EU-15	118.80	126.76	132.35	133.01	133.39	127.33	132.89	133.47	133.76
CEE-10	44.42	47.81	40.60	40.89	41.66	50.25	41.81	41.91	42.56
EU-25	(163.22)	(174.57)	172.95	173.90	175.05	(177.58)	174.70	175.37	176.33
other use									
EU-15	5.94	6.11	6.05	6.04	6.04	6.34	6.28	6.27	6.27
CEE-10	6.03	4.70	8.07	7.76	8.28	6.34	8.44	8.79	8.83
EU-25	(11.97)	(10.81)	14.11	13.80	14.32	(12.68)	14.73	15.06	15.10
domestic use									
EU-15	184.48	196.97	203.01	203.74	204.09	199.70	205.60	206.27	206.55
CEE-10	71.38	73.97	68.57	68.68	70.01	78.10	71.53	71.98	72.67
EU-25	(255.86)	(270.94)	271.58	272.42	274.10	(277.80)	277.13	278.24	279.22
annual marketable surplus									
EU-15	23.54	24.22	14.81	13.84	13.68	27.21	18.36	17.28	17.16
CEE-10	3.72	9.45	23.67	28.32	27.19	8.68	21.10	27.35	27.57
EU-25	(27.26)	(33.67)	38.48	42.17	40.87	(35.89)	39.46	44.63	44.72

Table A3-2: EU and CEEC Market Balance for Wheat* under different Scenarios (Mill. t)

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	101.90	111.53	111.39	111.22	111.20	113.93	113.81	113.64	113.59
CEEC-10	29.48	34.10	35.15	36.68	36.65	35.65	34.42	37.83	37.97
EU-25	(131.38)	(145.63)	146.54	147.90	147.85	(149.58)	148.23	151.47	151.57
domestic use									
human demand									
EU-15	42.26	45.91	46.14	46.20	46.19	47.47	47.64	47.71	47.72
CEEC-10	14.16	14.36	13.36	13.44	13.48	14.36	14.71	14.70	14.70
EU-25	(56.41)	(60.27)	59.50	59.64	59.67	(61.83)	62.35	62.41	62.41
feed demand									
EU-15	46.00	47.83	47.25	47.44	47.70	48.88	48.64	48.68	48.93
CEEC-10	10.25	11.40	9.52	9.46	9.46	11.99	10.13	9.98	9.91
EU-25	(56.25)	(59.23)	56.77	56.90	57.16	(60.87)	58.77	58.67	58.84
other use									
EU-15	3.15	3.62	3.61	3.60	3.60	3.74	3.73	3.72	3.72
CEEC-10	2.25	2.97	3.64	3.72	3.72	4.15	3.59	3.78	3.79
EU-25	(5.39)	(6.59)	7.25	7.32	7.32	(7.89)	7.32	7.50	7.51
total domestic use									
EU-15	91.40	97.36	97.00	97.25	97.50	100.10	100.01	100.12	100.37
CEEC-10	26.66	28.73	26.52	26.62	26.66	30.49	28.43	28.46	28.40
EU-25	(118.06)	(126.09)	123.52	123.87	124.16	(130.59)	128.44	128.58	128.76
annual marketable surplus									
EU-15	10.50	14.16	14.38	13.97	13.69	13.83	13.80	13.52	13.23
CEEC-10	2.82	5.37	8.63	10.06	10.00	5.16	5.99	9.37	9.58
EU-25	(13.32)	(19.53)	23.02	24.03	23.69	(18.99)	19.79	22.89	22.81

*including durum wheat

Table A3-3: EU Market Balance for Coarse Grains under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	106.12	109.67	106.43	106.36	106.57	112.98	110.15	109.91	110.12
CEEC-10	45.62	49.32	57.08	60.43	60.60	51.13	58.20	61.50	62.26
EU-25	(151.74)	(158.99)	163.51	166.79	167.17	(164.11)	168.36	171.41	172.38
domestic use									
human demand									
EU-15	17.48	18.19	18.48	18.49	18.47	18.55	18.79	18.82	18.80
CEEC-10	6.78	7.09	6.54	6.59	6.59	7.16	6.57	6.59	6.58
EU-25	(24.26)	(25.29)	25.02	25.08	25.06	(25.71)	25.35	25.40	25.38
feed demand									
EU-15	72.80	78.93	85.10	85.57	85.69	78.45	84.26	84.78	84.83
CEEC-10	34.16	36.41	31.08	31.43	32.21	38.26	31.68	31.92	32.65
EU-25	(106.97)	(115.34)	116.17	117.00	117.89	(116.71)	115.93	116.70	117.49
other use									
EU-15	2.79	2.49	2.43	2.43	2.44	2.60	2.55	2.55	2.55
CEEC-10	3.78	1.73	4.43	4.66	4.61	4.47	4.85	5.01	5.04
EU-25	(6.57)	(4.23)	6.86	7.09	7.05	(7.07)	7.40	7.56	7.59
total domestic use									
EU-15	93.08	99.61	106.01	106.49	106.59	99.60	105.60	106.15	106.19
CEEC-10	44.73	45.24	42.05	42.68	43.40	49.89	43.09	43.52	44.28
EU-25	(137.80)	(144.85)	148.05	149.17	150.00	(149.49)	148.69	149.67	150.46
annual marketable surplus									
EU-15	13.04	10.06	0.43	-0.13	-0.02	13.38	4.56	3.77	3.93
CEEC-10	0.89	4.08	15.03	17.75	17.19	1.25	15.11	17.98	17.99
EU-25	(13.93)	(14.14)	15.46	17.62	17.18	(14.62)	19.67	21.75	21.92

Table A3-4: EU Market Balance for Barley under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	50.40	47.14	47.43	47.47	47.45	47.97	48.16	48.22	48.21
CEEC-10	10.95	11.76	12.63	13.14	13.04	12.02	12.81	13.54	13.62
EU-25	(61.35)	(58.91)	60.06	60.61	60.49	(59.99)	60.98	61.76	61.83
domestic use									
human demand									
EU-15	8.04	8.20	8.20	8.20	8.20	8.29	8.29	8.29	8.29
CEEC-10	2.14	2.12	1.99	2.03	2.03	1.91	1.78	1.79	1.79
EU-25	(10.17)	(10.32)	10.19	10.23	10.23	(10.20)	10.07	10.08	10.08
feed demand									
EU-15	30.56	29.22	29.61	29.78	30.19	27.86	28.36	28.39	28.71
CEEC-10	8.26	8.87	7.52	7.85	8.04	10.23	7.47	7.53	7.67
EU-25	(38.82)	(38.09)	37.13	37.63	38.23	(38.09)	35.83	35.92	36.38
other use									
EU-15	1.86	1.73	1.74	1.74	1.74	1.77	1.78	1.78	1.78
CEEC-10	1.23	0.88	1.47	1.62	1.49	1.18	1.83	1.86	1.87
EU-25	(3.09)	(2.60)	3.21	3.36	3.23	(2.95)	3.61	3.64	3.65
total domestic use									
EU-15	40.46	39.15	39.55	39.72	40.13	37.92	38.43	38.46	38.78
CEEC-10	11.63	11.87	10.98	11.49	11.56	13.32	11.08	11.18	11.32
EU-25	(52.08)	(51.01)	50.54	51.21	51.69	(51.25)	49.51	49.64	50.10
annual marketable surplus									
EU-15	9.94	8.00	7.88	7.74	7.31	10.05	9.73	9.76	9.43
CEEC-10	-0.67	-0.10	1.65	1.65	1.49	-1.30	1.73	2.36	2.30
EU-25	(9.27)	(7.89)	9.53	9.39	8.80	(8.75)	11.46	12.12	11.73

Table A3-5: EU Market Balance for Maize under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	37.13	42.10	38.39	38.27	38.51	43.28	40.11	39.79	40.01
CEEC-10	19.25	20.70	24.45	24.65	24.77	21.62	24.59	24.69	24.92
EU-25	(56.39)	(62.80)	62.84	62.92	63.28	(64.90)	64.70	64.48	64.93
domestic use									
human demand									
EU-15	6.76	7.13	7.41	7.43	7.41	7.37	7.60	7.63	7.61
CEEC-10	2.12	2.23	2.09	2.10	2.09	2.33	2.18	2.19	2.19
EU-25	(8.88)	(9.36)	9.51	9.52	9.50	(9.70)	9.79	9.82	9.80
feed demand									
EU-15	30.56	35.70	41.54	41.85	41.58	36.63	41.96	42.47	42.23
CEEC-10	14.95	15.55	12.77	12.78	13.43	16.11	13.66	13.85	14.42
EU-25	(45.51)	(51.25)	54.31	54.63	55.01	(52.74)	55.61	56.32	56.65
other use									
EU-15	0.22	0.22	0.14	0.14	0.14	0.24	0.18	0.17	0.18
CEEC-10	0.25	0.33	0.41	0.42	0.42	0.32	0.42	0.42	0.43
EU-25	(0.47)	(0.55)	0.56	0.56	0.57	(0.56)	0.60	0.59	0.60
total domestic use									
EU-15	37.54	43.05	49.09	49.42	49.14	44.24	49.74	50.28	50.02
CEEC-10	17.32	18.11	15.28	15.29	15.95	18.76	16.26	16.46	17.04
EU-25	(54.86)	(61.16)	64.37	64.71	65.08	(63.00)	65.99	66.74	67.06
annual marketable surplus									
EU-15	-0.41	-0.95	-10.70	-11.15	-10.63	-0.96	-9.63	-10.48	-10.01
CEEC-10	1.93	2.58	9.17	9.36	8.82	2.86	8.34	8.23	7.88
EU-25	(1.53)	(1.63)	-1.53	-1.79	-1.81	(1.90)	-1.29	-2.25	-2.13

Table A3-6: EU Market Balance for Rye under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	6.66	6.91	6.91	6.92	6.91	7.29	6.96	6.92	6.91
CEEC-10	6.27	7.70	10.42	13.03	13.13	8.40	11.28	13.65	14.08
EU-25	(12.93)	(14.61)	17.33	19.95	20.04	(15.69)	18.24	20.57	21.00
domestic use									
human demand									
EU-15	1.69	1.70	1.70	1.70	1.70	1.71	1.70	1.70	1.70
CEEC-10	2.36	2.57	2.30	2.31	2.31	2.73	2.44	2.44	2.44
EU-25	(4.05)	(4.26)	4.00	4.01	4.01	(4.44)	4.14	4.14	4.14
feed demand									
EU-15	1.82	2.85	2.84	2.85	2.84	2.86	2.84	2.85	2.84
CEEC-10	3.06	2.85	2.81	2.81	2.81	2.92	2.75	2.75	2.75
EU-25	(4.88)	(5.69)	5.64	5.65	5.66	(5.78)	5.59	5.59	5.59
other use									
EU-15	0.20	0.19	0.19	0.19	0.19	0.19	0.18	0.18	0.18
CEEC-10	0.93	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
EU-25	(1.13)	(1.07)	1.07	1.07	1.07	(1.07)	1.06	1.06	1.06
total domestic use									
EU-15	3.71	4.73	4.72	4.73	4.72	4.76	4.72	4.72	4.72
CEEC-10	3.36	3.30	3.00	3.00	3.01	3.53	3.07	3.07	3.08
EU-25	(10.06)	(11.03)	10.71	10.73	10.74	(11.29)	10.79	10.79	10.79
annual marketable surplus									
EU-15	2.96	2.19	2.20	2.19	2.19	2.53	2.25	2.20	2.20
CEEC-10	-0.36	1.40	4.42	7.03	7.12	1.87	5.20	7.58	8.01
EU-25	(2.59)	(3.58)	5.62	9.22	9.31	(4.39)	7.45	9.78	10.20

Table A3-7: EU Market Balance for Other Grains under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	11.92	13.51	13.70	13.71	13.71	14.44	14.92	14.98	14.99
CEEC-10	9.22	9.15	9.53	9.61	9.64	9.15	9.53	9.61	9.64
EU-25	(21.14)	(22.66)	23.23	23.32	23.35	(23.59)	24.45	24.60	24.63
domestic use									
human demand									
EU-15	0.99	1.17	1.17	1.17	1.17	1.18	1.20	1.20	1.20
CEEC-10	0.16	0.17	0.15	0.15	0.15	0.18	0.16	0.16	0.16
EU-25	(1.15)	(1.34)	1.32	1.32	1.32	(1.36)	1.36	1.36	1.36
feed demand									
EU-15	9.86	11.16	11.11	11.09	11.07	11.10	11.09	11.08	11.06
CEEC-10	7.90	8.09	7.98	7.97	7.99	8.30	7.80	7.80	7.81
EU-25	(17.76)	(19.24)	19.09	19.06	19.06	(19.41)	18.90	18.88	18.87
other use									
EU-15	0.52	0.36	0.37	0.37	0.37	0.40	0.41	0.42	0.42
CEEC-10	1.09	0.70	1.66	1.80	1.59	0.57	1.72	1.84	1.86
EU-25	(1.60)	(1.06)	2.02	2.17	1.95	(0.97)	2.13	2.25	2.28
total domestic use									
EU-15	11.37	12.68	12.64	12.62	12.60	12.69	12.71	12.69	12.67
CEEC-10	3.14	3.96	3.79	3.93	3.73	9.05	9.69	9.80	9.84
EU-25	(20.51)	(21.64)	22.43	22.55	22.33	(21.74)	22.39	22.50	22.51
annual marketable surplus									
EU-15	0.55	0.83	1.06	1.09	1.11	1.76	2.21	2.29	2.32
CEEC-10	0.08	0.10	-0.16	-0.19	-0.20	0.10	-0.16	-0.19	-0.20
EU-25	(0.63)	(0.93)	0.90	0.90	0.91	(1.86)	2.05	2.10	2.12

Table A3-8: EU Market Balance for Oilseeds under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	12.14	12.60	12.96	12.96	12.95	13.07	13.52	13.52	13.52
CEEC-10	4.42	5.43	3.89	4.05	4.10	5.78	3.96	4.16	4.17
EU-25	(16.55)	(18.03)	16.85	17.01	17.06	(18.85)	17.48	17.68	17.68
domestic use									
EU-15	31.35	34.01	34.03	34.03	34.03	34.19	34.22	34.22	34.22
CEEC-10	4.45	4.56	4.44	4.48	4.78	4.56	4.43	4.49	4.49
EU-25	(35.80)	(38.57)	38.46	38.51	38.81	(38.76)	38.65	38.71	38.71
annual marketable surplus									
EU-15	-19.21	-21.41	-21.07	-21.07	-21.07	-21.12	-20.70	-20.70	-20.70
CEEC-10	-0.03	0.87	-0.54	-0.43	-0.68	1.22	-0.48	-0.34	-0.33
EU-25	-(19.25)	-(20.54)	-21.61	-21.50	-21.75	-(19.90)	-21.18	-21.03	-21.03

Table A3-9: Production and Domestic Use of Domestically Produced Milk (Mill. t)

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	121.20	124.22	124.22	123.83	122.35	124.22	124.22	124.22	124.22
CEEC-10	27.81	24.96	26.30	26.89	30.34	23.49	26.89	26.94	32.05
EU-25	(149.01)	(149.18)	150.52	150.72	152.68	147.71)	51.11	51.16	56.27
liquid and fresh milk products									
EU-15	30.00	32.52	32.87	33.09	33.37	32.86	33.75	32.71	34.18
CEEC-10	10.61	10.61	10.61	9.54	9.65	10.14	10.14	10.14	10.19
EU-25	(40.61)	(43.13)	43.48	42.63	43.03	(42.99)	43.88	42.85	44.37
manufacturing									
EU-15	84.40	84.90	84.55	83.94	82.17	84.56	83.67	84.71	83.24
CEEC-10	17.20	14.35	15.69	17.35	20.68	13.36	16.75	16.80	21.86
EU-25	(101.60)	(99.25)	100.24	101.29	102.86	(97.92)	100.42	101.52	105.10

Table A3-10: EU Market Balance for Beef under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	7.89	7.84	7.80	7.76	7.61	8.03	8.01	8.00	7.85
CEEC-10	1.08	0.89	1.04	1.12	1.32	0.81	1.07	1.08	1.34
EU-25	(8.97)	(8.74)	3.84	3.87	8.93	(8.84)	9.09	9.08	9.20
human demand									
EU-15	7.03	7.54	7.55	7.58	7.67	7.73	7.75	7.75	7.84
CEEC-10	1.03	1.09	0.93	0.91	0.95	1.15	0.95	0.95	0.96
EU-25	(8.06)	(8.63)	3.49	3.48	8.61	(8.88)	8.70	8.71	8.80
annual marketable surplus									
EU-15	0.86	0.30	0.25	0.18	-0.06	0.29	0.27	0.24	0.01
CEEC-10	0.05	-0.20	0.10	0.21	0.37	-0.34	0.12	0.13	0.38
EU-25	(0.90)	(0.10)	0.35	0.39	0.31	-(0.05)	0.39	0.37	0.39

Table A3-11: EU Market Balance for Butter under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	1.79	1.80	1.79	1.79	1.80	1.83	1.80	1.80	1.80
CEEC-10	0.33	0.28	0.31	0.32	0.36	0.24	0.32	0.32	0.37
EU-25	(2.12)	(2.08)	2.10	2.10	2.16	(2.07)	2.11	2.12	2.17
domestic use									
EU-15	1.73	1.68	1.68	1.68	1.68	1.66	1.66	1.66	1.66
CEEC-10	0.28	0.30	0.27	0.27	0.27	0.29	0.26	0.26	0.26
EU-25	(2.00)	(1.98)	1.95	1.95	1.96	(1.95)	1.92	1.92	1.92
annual marketable surplus									
EU-15	0.07	0.11	0.10	0.10	0.12	0.16	0.14	0.14	0.14
CEEC-10	0.05	-0.02	0.04	0.05	0.09	-0.04	0.06	0.06	0.11
EU-25	(0.11)	(0.10)	0.15	0.15	0.21	(0.12)	0.19	0.19	0.25

Table A3-12: EU Market Balance for Cheese under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	6.99	7.37	7.44	7.45	7.31	7.58	7.80	7.80	7.78
CEEC-10	0.91	0.73	0.83	0.84	1.08	0.60	0.81	0.81	1.07
EU-25	(7.91)	(8.10)	3.26	3.28	8.39	(8.18)	8.61	8.61	8.85
domestic use									
EU-15	6.92	7.11	7.12	7.17	7.26	7.32	7.32	7.43	7.51
CEEC-10	0.85	0.94	0.82	0.83	0.84	1.04	0.89	0.90	0.91
EU-25	(7.76)	(8.05)	7.94	8.00	8.10	(8.14)	7.99	8.11	8.20
annual marketable surplus									
EU-15	0.08	0.26	0.32	0.28	0.05	0.26	0.49	0.38	0.27
CEEC-10	0.07	-0.20	0.01	0.00	0.24	-0.44	-0.08	-0.09	0.17
EU-25	(0.15)	(0.05)	0.32	0.28	0.29	-(0.17)	0.40	0.29	0.43

Table A3-13: EU Market Balance for Poultry under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	9.20	10.12	9.83	9.85	9.86	10.38	10.20	10.21	10.21
CEEC-10	1.83	2.03	2.36	2.25	2.25	2.15	2.28	2.28	2.26
EU-25	(11.03)	(12.15)	12.19	12.10	12.11	(12.54)	12.48	12.48	12.47
domestic use									
EU-15	8.66	9.51	9.62	9.61	9.60	9.79	9.85	9.85	9.84
CEEC-10	1.75	1.85	1.74	1.76	1.75	1.96	1.90	1.90	1.89
EU-25	(10.41)	(11.37)	11.35	11.37	11.35	(11.75)	11.75	11.75	11.74
annual marketable surplus									
EU-15	0.54	0.60	0.21	0.25	0.26	0.60	0.35	0.35	0.37
CEEC-10	0.09	0.18	0.63	0.49	0.51	0.19	0.38	0.38	0.37
EU-25	(0.62)	(0.78)	0.84	0.74	0.77	(0.79)	0.74	0.73	0.73

Table A3-14: EU Market Balance for Pork under Different Scenarios (Mill. t).

	base	2007				2012			
		baseline	CAP	CAP DP	CC Position	baseline	CAP	CAP DP	CC Position
production									
EU-15	18.05	18.76	19.52	19.67	19.96	19.44	20.25	20.33	20.59
CEEC-10	4.34	4.80	4.29	4.23	3.98	5.19	4.59	4.54	4.22
EU-25	(22.39)	(23.56)	23.81	23.90	23.94	(24.63)	24.84	24.88	24.81
domestic use									
EU-15	16.96	17.62	17.43	17.41	17.40	18.29	18.08	18.06	18.02
CEEC-10	4.17	4.63	5.15	5.20	5.16	5.02	5.52	5.52	5.50
EU-25	(21.14)	(22.25)	22.58	22.61	22.57	(23.32)	23.60	23.58	23.52
annual marketable surplus									
EU-15	1.09	1.14	2.09	2.26	2.56	1.15	2.18	2.27	2.56
CEEC-10	0.17	0.17	-0.86	-0.97	-1.19	0.17	-0.93	-0.98	-1.28
EU-25	(1.26)	(1.31)	1.23	1.29	1.38	(1.32)	1.24	1.29	1.28

12. ANNEX 4: IMPACT ANALYSES OF EU ENLARGEMENT TO THE CEECs IN LITERATURE

A body of literature has been developing which deals with quantitative analyses of the impacts of CEEC-EU accession on agricultural markets, government budgets and welfare effects. The literature displays a changing perception of developments on markets in the CEECs. The early analyses, having in mind the large agricultural potential, assume that freeing agriculture from the restrictions of central planning would soon lead to a recovery and expansion of agriculture in the CEECs. At that time prices in the CEECs were significantly lower than in the EU, often below comparable world market prices such that agriculture was expected to react to the foreseen price increases. Examples of these optimistic views on agriculture in the CEECs are Anderson and Tyers (1993 and 1995) and Tangermann and Josling (1994).

Despite a gradual alignment of important agricultural prices between CEECs and the EU the stagnation of agricultural production observed in the second half of the 1990s has continued. The analyses became less optimistic and the lack of functioning institutions has been emphasised. With the gradual implementation of the *acquis communautaire* in preparation of accession, institutions have increasingly aligned and integration of CEEC agriculture and food industries in the European markets has continued. Despite increasing market integration and institutional development, agricultural production is not foreseen to expand significantly.

A newer strain of literature examines the effects causing the obvious slow pace of restructuring, especially related to the particular structure of production technologies and costs, and the effects of macroeconomic developments, which affect internal and external competitiveness. Swinnen and Bojnec (1997) and Bojnec, Münch and Swinnen (1999) show that macroeconomic developments (exchange rates) largely offset the increasing protection of agricultural policies in the CEECs. Usually structural change in the long run and changing production technologies in the short run could offset these competitive pressures. Pouliquen (2001) demonstrates the limited possibilities of adjustment of agriculture in the CEECs under current domestic policies.

A number of analyses, including the present one, have picked up these recent arguments. Of the many, Fransen et.al. (2000) and Frohberg et.al. (2001) are used as a comparison to the present analysis.

Frandsen and Jensen (2000) use a General Computable Equilibrium Model (CGE), GTAP, to simulate the accession effects, while Frohberg (2001) and DG Agri use partial equilibrium models. A CGE is an economy wide model, where agriculture is just one of many sectors. GTAP disaggregates agriculture also into 19 agricultural products. The other two studies use partial equilibrium models focusing on agricultural markets but taking key economic variables into account. Because of restricting methodological reasons, partial equilibrium models usually model agricultural policies in greater detail than is possible in CGEs.

Table A4-1: Comparison of Methods and Base Data

	Frandsen and Jensen (2000)	Frohberg et.al. (2001)	DG Agri (2001)
method	Computable General Equilibrium Model	Partial Equilibrium Model	Partial Equilibrium Model
market data	CEEC-10 aggregate data based on 1986 World Bank Input Output tables	10 CEECs 1997	10 CEECs EU ROW 1996 to 2000 including short term forecast to 2002
prices	OECD PSE tables	OECD 1997	Expert Network, quality adjusted prices 1999
policies	1995 tariff equivalents quotas, direct payments	1997 OECD PSE tariff equivalents quotas, direct payments	1999 Expert Network detailed policies quotas, direct payments
macro data	OECD, World Bank	OECD	DG ECFIN Expert Network

Fransen and Jensen include the CEECs as an aggregate based on GTAP version 4, which uses World Bank Input Output data of 1986 to separate the CEECs from the former Soviet Union of version 3. The country detail in Frohberg and in DG Agri is much higher with 10 individual CEECs and in case of DG Agri including also the EU-15. The data base of DG Agri is the most recent compared to the other analyses. Regarding the high variation of weather conditions in the CEECs, a single year as a reference year chosen by Frandsen and Jensen as well as by Frohberg might alter the interpretation of their results (1995 being a good year, while 1997 being a year with exceptional prices on world and CEEC markets).

Tables A4-1 and A4-2 summarise key results of the analyses. However, it should be noted that scenarios are different between the studies. The present study takes into account the different negotiation positions, while Frohberg et.al. 2001 only takes a position into account, which resembles more *CAP DP* of the present analysis. Frandsen and Jensen (2000) use different assumptions from which the results of more comparable scenarios have been included in the tables.

Table A4-2: Comparison of Selected Results of CEEC-EU Accession Impact Analysis for Cereals (relative to the non-accession scenario)

Source	Frandsen and Jensen (2000)	Frohberg et.al. (2001)	DG Agri (2001)
Reference Year	2010	2007	2012
crops			
cereal and oilseed area	+4% to +50%	fixed	+<1% to +14.7%
yields	exogenous	exogenous	endogenous
set-aside	yes, approximated	yes, including small producers	yes, including small producers
production	wheat: EU: -0.4 to -1.9% CEECs: -6.6% to 12.3%	wheat: CEECs: -7%	wheat: EU: -0.3% to +6% CEECs: -3.6% to +6.4%
domestic use	coarse grains: EU: -3.7% to -7.2% CEECs: 28.9% to 63.2%	coarse grains: CEECs: -1%	coarse grains: EU: -3% to -2.7% CEECs: 13.8% to 21.7%
CEEC surplus	n.a.	wheat: CEECs: 4%	wheat: EU: to +0.6% CEECs: -6.3%
		coarse grains: CEECs: 0%	coarse grains: EU: +5.4% to +6.6% CEECs: -11.4% to -13.7%
		5.9 Mill. t wheat	6 to 9.6 Mill. t wheat
		7.2 Mill. t coarse grains	15.1 to 17.9 Mill. t coarse grains

Frandsen and Jensen show with their GTAP model the largest supply reactions in the CEECs, unfortunately the source does not give the figures for market surpluses and domestic use. Regarding the strong reactions of the model, substantial market surpluses could be expected; more substantial than the other two impact analyses.

GTAP reacts very sensitively to the introduction of direct payments. In the scenarios the area allocated to cereals and oilseeds increases up to 50% (approximately 15 Mill. ha or the entire arable area), sources being for example vegetable production. Frohberg, on the other hand, keeps the area fixed. Base area in Frohberg's model therefore acts as a supply control

instrument, which explains some of the negative effects of accession on production of crops. The simulation of DG Agri included a possibility of shifting area according to their attractiveness because the regulations foresee only a reduction of area payments for the overshoot of base area. Base area is therefore acting as an instrument to restrict increases of area payments per member country. By assessing the actual land reserve of some 6.5 – 7.5 Mill. ha and including the relative profitability of crops on a recent basis, the assessment of ESIM shows an increase of area of 3.7 to 3.9 Mill. ha depending on the level of area payments.

The additional area and the low impact of set-aside, which is assumed to be at a reference rate of 10%, explain a part of the surpluses in the present analysis in relation to those of Frohberg. The other part of the obviously low impact of accession on coarse grains in Frohberg is the choice of the reference year of policies, which is 1997 in Frohberg and 1999 in DG Agri. In many respects 1997 was an exceptional year in terms of price gaps between the CEECs and the EU, while this gap widens especially for coarse grains again in 1999. Another aspect is related to the relative development of exchange rates of the EUR, the CEEC currencies and the USD.

The other aspect explaining the differences of cereal surpluses are the different reactions on the domestic use side. DG Agri projects a serious weakness of grain-fed livestock production compared to that of the EU-15. One of the manifestations are the high conversion rates of feed into livestock presently observed in the CEECs (Pouliquen 2001). The price drop on accession for pork might explain the other aspect related to the decline of domestic use. While average prices for pork are close or even above EU prices, especially in recent years, the prices of high quality carcasses are in most cases substantially above EU prices. Another point relates to the specific policies in place in the CEECs, which tend to insulate the pork markets from third country markets due to high tariffs as well as policies of direct market intervention. Accession, therefore, results in an environment of higher prices for coarse grains and lower prices for pork of comparable quality.

The results for milk production are quite similar between Frandsen and Jensen, and Frohberg. Quotas appear to be binding immediately and milk production increases in their specific base line scenarios. The present analysis distinguishes clearly between baseline developments under current policies, which tend to deteriorate further the internal competitiveness of milk production unless more investments and/or higher protection are put into place. The decline in ESIM explains the high percentage increases compared to the baseline, though very small increases compared to the starting point. Moreover, the high request in the Candidate Countries' positions are only met after a longer transition period.

Table A4-3: Comparison of Selected Results of CEEC-EU Accession Impact Analysis for Livestock Products (relative to the non-accession scenario)

Source	Frandsen and Jensen (2000)	Frohberg et.al. (2001)	DG Agri (2001)
Reference Year	2010	2007	2012
milk			semi-subsistence production taken into account
herd	endogenous	endogenous	endogenous
yields	exogenous	exogenous	endogenous
production	EU-15: 0% CEECs: 0%	CEECs:-4%	EU-15: 0% CEECs: +14% to 39% (-3% and +14% compared to the base) different quota levels
domestic use	n.a.	-17%	-10%
CEEC surplus	n.a.	4.02 Mill. t	1.8 Mill. t to 7 Mill. t (depending on the quota level)
beef			
production	EU-15: -4.3 to -3.9% CEECs:+85.1% to 93.9%	CEECs:+22%	EU-15: -2.2% to -0.3% CEECs:+33% to 65% (-1% to +24% compared to the base)
domestic use	n.a.	-33%	-17%
CEEC surplus	n.a.	0.734 Mill. t	0.12 Mill. t to 0.38 Mill. t
pork			
production	“other meats” EU-15: -0.4 to -0.1 CEECs:-0.9% to -4.3%	CEECs: -5%	EU-15: +4.4% to +6% CEECs: -18% to -11%
domestic use	n.a.	CEECs:+8%	EU-15: -1.3 to -1.5 CEECs:+9.9%
CEEC surplus	n.a.	0.075 Mill. tt	-0.93 to -1.28 Mill. t
poultry			
production	n.a.	CEECs: -11%	EU-15: -1.8% CEECs: +6%
domestic use		CEECs:+30%	EU-15: +<1% CEECs:-3.1%
CEEC surplus		-0.917 Mill. t	0.38 Mill. t

Beef production almost doubles in Frandsen and Jensen’s projections. A much smaller rate of expansion appears to happen in ESIM compared to the starting point. Here again, beef production declines. The resulting market surpluses are much smaller than in Frohberg, which

explains the lower impact of quality adjusted prices but the higher impact of the development of the dairy cattle herd with respect to different quota levels and levels of direct payments.

For the accession effects on the EU-15 only Frandsen and Jensen give comparable figures. Here the supply side reactions are more pronounced in the CEECs for beef, which expands a lot more in their projections, and less for other meats than the comparable figures in ESIM. The same argument holds for cereals and the other products. On the whole, the same trends in reactions can be observed in the two analyses.

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