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Accession of the Czech Republic, Hungary, and Poland to the European Union: Impacts on Agricultural Markets

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Abstract

Using a world agricultural multimarket model, we analyze the consequences of enlargement of the European Union (EU) to include the Czech Republic, Hungary, and Poland for agricultural markets. We produce a market outlook through the year 2010 for two enlargement scenarios, which are based on different assumptions regarding the restrictions on grain and dairy production in the acceding countries. In both scenarios, accession of the three Central and Eastern European countries (CEECs) leads to a permanent but moderate decrease in EU prices for virtually all commodities. For the three acceding CEECs, domestic prices increase dramatically. Their final consumption of agricultural products decreases in most instances, while production rises. Higher domestic prices in the CEECs reduce exports of most commodities to non-union countries. Consequently, excess supplies are placed in stocks or exported to the original 15 member countries. The imposition of supply management mechanisms in the dairy and grain sectors reduces the buildup of surpluses in the new member states. However, supply constraints limit the ability of the new members to take advantage of the expanded market.

Keywords

CAP, economic integration, EU enlargement, agricultural trade, Czech Republic, Hungary, Poland

Disciplines

Agricultural and Resource Economics | Agricultural Economics | Eastern European Studies | International Economics

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Abstract

Using a world agricultural multimarket model, we analyze the consequences of enlargement of the European Union (EU) to include the Czech Republic, Hungary, and Poland for agricultural markets. We produce a market outlook through the year 2010 for two enlargement scenarios, which are based on different assumptions regarding the restrictions on grain and dairy production in the acceding countries. In both scenarios, accession of the three Central and Eastern European countries (CEECs) leads to a permanent but moderate decrease in EU prices for virtually all commodities. For the three acceding CEECs, domestic prices increase dramatically. Their final consumption of agricultural products decreases in most instances, while production rises. Higher domestic prices in the CEECs reduce exports of most commodities to non-union countries. Consequently, excess supplies are placed in stocks or exported to the original 15 member countries. The imposition of supply management mechanisms in the dairy and grain sectors reduces the buildup of surpluses in the new member states. However, supply constraints limit the ability of the new members to take advantage of the expanded market.

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ACCESSION OF THE CZECH REPUBLIC, HUNGARY, AND POLAND TO THE EUROPEAN UNION: IMPACTS ON AGRICULTURAL MARKETS

Introduction

Using a world agricultural multimarket model, we analyze the impact on agricultural markets of enlarging the European Union (EU) to include the Czech Republic, Hungary, and Poland in 2003. We consider two possible sets of assumptions for applying the Common Agricultural Policy (CAP) in the new member countries.¹ The two sets are motivated by the uncertainty surrounding the conditions under which the three countries will accede to the EU. In the first scenario, we assume the price support components of the CAP are extended to the three acceding Central and Eastern European countries (CEECs) as they exist under the recent Agenda 2000 reforms. However, we do not impose area set-aside constraints on grain and oilseed production in the new member countries, nor do we assume that grain and livestock producers receive the existing direct payments. Dairy marketing quotas are imposed in the first scenario, and they are set at volumes requested by the acceding countries (Agra Europe Ltd., 1999a; 1999b; 2000a).

In the second scenario, we assume producers in the acceding countries receive the direct payments that exist in the current CAP regime in exchange for the imposition of mandatory area set-aside in the grain and oilseed sectors. We also alter the dairy quota assumption by deriving the quota levels in the acceding countries from production levels projected by FAPRI (2000). The quota levels in the second scenario are generally more restrictive than those currently requested by the applicant countries. We assess the impact of the enlargement in deviation from the baseline in FAPRI (2000), which we treat as the business-as-usual scenario.

In both scenarios, accession of the three CEECs leads to a permanent but moderate decrease in EU prices for virtually all commodities. For the three acceding CEECs, domestic prices increase dramatically for many commodities. Their final consumption

of agricultural products decreases in most instances, while production rises. Higher domestic prices in the CEECs reduce exports of most commodities to third (non-union) countries. Consequently, excess supplies are placed in stocks or exported to the original 15 member countries. The imposition of supply management mechanisms in the dairy and grain sectors reduces the buildup of surpluses in the new member states. However, supply constraints limit the ability of the new members to take advantage of the expanded market.

Our analysis contributes to the recent literature on the integration of European agriculture into a common market (Albiac and Garcia; Anderson and Tyers; Baldwin, Haaparanta, and Kiander; Monke et al., among others). Several of these studies have looked at the specific case of the CEECs (Hertel et al.; Frandsen et al.; Josling et al.; Leetma et al.; Liapis and Tsigas; Fuller et al.; European Commission, 1997). Our paper has at least two unique features. First, we incorporate the recent reforms of the Common Agricultural Policy (CAP) embodied in the Berlin Accord on Agenda 2000 (Council of the European Union). Previous papers abstracted from these changes in the CAP or used the initially proposed changes, which differ from the final measures included in the Berlin Accord. Moreover, by focusing on the three countries with significant agricultural sectors that are most likely to become EU members in the short run, we provide more plausible estimates of the potential impacts of enlargement than do studies that assume all ten CEECs enter simultaneously.

In the next section, we briefly discuss the background for enlargement of the EU and the issues that are relevant to our analysis of agricultural markets. This discussion is followed by a summary of the baseline projections. Then, the baseline projections are used as a point of reference for discussing the impacts of enlarging the EU. Detailed results from the three scenarios (baseline, two accession scenarios) are presented in tables grouped in an appendix available upon request.

Background and Relevant Issues

Following the fall of the Berlin Wall in 1989, most CEECs embarked on a process of establishing democratic governments and market-driven economies. In part to

promote political and economic stability in the region, the European Council agreed in 1993 that the CEECs with an established association with the EU could become members of the European Union. Accession of new members was to occur as the candidates demonstrated their ability to assume the political and economic obligations of membership. By the summer of 1996, all 10 of the associate CEECs had applied for membership to the EU. In 1998, accession negotiations began with Cyprus and the five CEECs (Czech Republic, Estonia, Hungary, Poland, and Slovenia) that had made the most progress toward meeting the accession criteria. Although no specific date for accession has been set, the EU has targeted the year 2002 as its date to be ready to receive new members. We assume in our analysis that the three CEECs considered in this study are ready for accession in 2003. Pinning down the exact date is immaterial to our assessment.

An early analysis by the European Commission of the effects of EU enlargement to the east identified a number of key areas posing challenges to the enlargement process. The agricultural sector was identified as particularly troublesome because of the high level of support producers in the EU receive through the CAP and because of the large number of farmers in several of the applicant countries. The Commission report assumed that agricultural producers in the new member countries would be eligible to receive the CAP market support, but they would not receive the compensation payments instituted within the 1992 reforms. Even with this partial application of the CAP to the new member countries, the study concluded that enlargement would substantially increase the excess supply of grains, meat, and dairy products and greatly expand the already burdensome expenditures on agricultural support (European Commission, 1997).

Essential to this conclusion is the fact that prices of agricultural products in the CEECs are substantially lower than in the EU-15. Table 1 compares 1997, 1999, and 2002 commodity prices for the Czech Republic, Hungary, and Poland to those in the EU. In 1997, most prices in the three CEECs were between 5 and 50 percent below the EU prices, with the greatest differences in beef and dairy markets. By 1999, Czech wheat and barley prices had climbed above EU prices due to declines in domestic supplies because of drought and rising production costs. FAPRI baseline projections suggest that the price

gaps will decrease for many commodities in the near term, as prices in the applicant countries rise and EU prices fall. Some prices in the CEECs may actually exceed the level in the EU in some instances.² The key point is that the larger the price difference at accession, the larger the expected change in excess supply.

The potential for large excess supplies of agricultural products on the EU domestic markets, both with and without enlargement, prompted the European Commission to reform the CAP in 1999. The Berlin Accord on Agenda 2000 constitutes the most comprehensive plan for reform of the CAP since the “MacSharry” reforms in 1991-92. As with the MacSharry reforms, Agenda 2000 is intended to reduce support for commodities through market interventions and to increase support to farmers through direct payments, thereby relaxing the constraint on subsidized exports under World Trade Organization (WTO) commitments (Senior Nello and Smith).

TABLE 1. Prices of agricultural commodities in 1997, 1999, and 2002 (ECU/metric ton)³

	Czech Republic			Hungary			Poland			EU-15		
	1997	1999	2002	1997	1999	2002	1997	1999	2002	1997	1999	2002
Wheat	116	127	156	98	72	72	137	104	102	126	118	111
Corn	120	122	138	73	58	58	117	94	85	134	129	111
Barley	90	125	147	95	57	62	113	102	101	119	108	106
Beef	1884	2083	2782	1427	1110	1165	1447	1424	1507	2662	2303	2133
Pork	1393	1392	1659	1383	1127	1076	1242	1358	1063	1672	1121	1146
Poultry	996	1009	1146	1042	849	813	1215	1273	1205	1290	1066	1055
Fluid milk	193	214	207	214	159	148	150	144	140	297	283	277
Cheese	2657	2189	2210	4460	3268	3092	3309	2932	2920	4710	4626	4596
Butter	2312	2063	1990	3428	2452	2260	2367	2513	2300	3625	3551	3335
Milk powder	1377	1072	1045	1833	1471	1399	1471	1296	1296	2130	2057	2056

Implementation of the Agenda 2000 reforms should reduce the price gaps between the EU and the CEECs, facilitating enlargement. However, the increase in compensation payments and the introduction of new payments in the dairy sector intensify the problems of extending the full CAP provision to the new member countries. The Berlin Accord lays out very specific spending limits for agricultural support in acceding countries until 2006. These limits are based on the premise that direct payments will not be extended to

producers in the new member countries. Since the adoption of Agenda 2000, the discussion about direct payments has gravitated in favor of phasing in payments in the CEECs following accession. A major factor driving the debate is the implementation of supply controls in the new member countries. Producers in the CEECs would receive the direct payments to compensate them for adopting set-aside requirements, low stocking densities, and production quotas that are an integral part of the existing CAP. If the Commission adheres to the spending caps explicated in the Berlin Accord, it is likely that a revision of the direct payment scheme will be necessary prior to accession (Agra Europe Ltd., 2000b).

Our approach is to assume that the market support provisions of the CAP are implemented in the new member countries. In the first scenario, we assume that supply restrictions are imposed in the dairy sector but not in the grain and oilseed sectors of the new member countries. Direct producer payments are not offered to producers in the acceding countries. In the second scenario set-aside area requirements are imposed and direct payments are offered to all producers in the expanded EU. The specific supply constraint levels assumed in the analysis are discussed below.

In addition to the internal-market policies, the acceding CEECs will be required to adopt the EU external trade policy, including tariff schedules and preferential access agreements. In some instances, adoption of the EU tariff schedule should result in an increase in protection for the new member countries, and compensation would have to be made to affected countries. Moreover, export subsidy limitations agreed to under the World Trade Organization (WTO) agreement must be combined. Following the precedent set in the previous enlargement to include Austria, Sweden, and Finland, the subsidized intra-trade between the EU-15 and the acceding countries will be netted out of the combined subsidy level (Leetma et al.). In order to facilitate current trade flows and to avoid the loss of export subsidy allocations, the EU and the CEECs are currently seeking to negotiate “double-zero” agreements, which eliminate import tariffs and export subsidies on bilateral agricultural trade between the EU and the candidate countries (Agra Europe Ltd., 2000c). The combination of higher domestic prices and greater border protection creates a significant potential for diverting the CEECs agricultural trade from

third countries to EU members following accession. We further address trade diversion in the results section.

Our analysis assumes that border policies in the Czech Republic, Hungary, and Poland are harmonized to EU levels upon accession in both scenarios. We take into account current subsidized intra-trade in establishing export subsidy constraints in the enlarged union. In addition, we assume that no “double-zero” agreements are in effect on the eve of or after accession.

There are several other issues that are important to an analysis of EU enlargement to the east, but most are beyond the scope of this paper. For example, the quality of agricultural products, particularly processed products, varies greatly across the candidate countries. The three CEECs that are the focus of this study do not yet meet EU product safety and sanitation standards for all agricultural products. Consequently, the process of market price harmonization and trade may be hindered following accession. The Special Accession Program for Agriculture and Rural Development (SAPARD) is a newly created source of funds that will be available to the applicant countries to specifically address quality improvement and investment in the agricultural sector. The impacts of these investments cannot be captured directly in the partial equilibrium framework used in this study. Likewise, the dynamic growth effects created in the process of integration are important to the overall impact of EU enlargement, but they are beyond the scope of this study. Finally, we abstract from feedback effects from accession on consumer income growth in the three CEECs.

FAPRI Model and Baseline Summary

The FAPRI modeling system is a multi-market world agricultural model. The model is extensive in terms of both its geographic and commodity coverage. Functionally, the modeling system is organized into modules according to major commodity groupings (grains, oilseeds, livestock, and dairy) with country sub-models.⁴

The FAPRI model is driven by two major groups of exogenous shifters. First, the model incorporates forecasts of macroeconomic variables such as gross domestic product (GDP), inflation rates, exchange rates, and population. These forecasts come from

Standard and Poor's DRI, Project Link, and WEFA. The model also assumes that average weather will prevail in the projection period. Second, important domestic agricultural and trade policy instruments are integrated into the model specification. Apart from the policy changes contained in the enlargement scenario, domestic agricultural and commercial policies embodied in existing legislation and trade agreements are assumed to remain intact in all countries.

The FAPRI 2000 baseline projections for the grain sector call for a gradual recovery of grain and oilseed prices from the low levels in 1998 and 1999, reaching values on a par with the early 1990s. Despite the 20 percent reduction in the cereals intervention price in the Agenda 2000 reforms, EU-15 wheat exports are constrained by export subsidy commitments until 2004. As world wheat prices approach and exceed \$150 per metric ton (mt), EU wheat net exports rise from 13.3 to 22.8 million metric tons (mmt). EU wheat stocks are projected to continue to rise throughout the next decade, reaching 26 mmt by 2008. EU coarse grain production grows primarily through increased productivity, slightly exceeding the growth of feed demand.

Production of food and feed grains in Hungary and Poland is projected to increase steadily over the next decade, while the composition of grain production in the Czech Republic is expected to shift in favor of wheat. Fairly stagnant coarse grain production, coupled with steadily rising feed demand, is projected to raise Czech grain prices above EU levels. Hungarian grain net exports gradually grow from 2.2 to 3.3 mmt. Polish and Czech net imports of both food and feed grains are projected to increase steadily throughout the projection period, reaching 2.1 and 0.67 mmt, respectively, by 2009.

Agenda 2000 reforms in the EU livestock sector are concentrated in the beef and dairy sectors. The reduction of the beef intervention price in 2000 and 2001 allows beef intervention stocks to be released on the domestic market, putting downward pressure on the beef producer price in 2001. Beef prices are further weakened in 2002 to 2005 by the removal of supply control measures imposed after the outbreak of bovine spongiform encephalopathy (BSE) in 1995. The decline in feed costs associated with the CAP reforms enables production of pork and poultry to expand without substantial increases in

producer prices. Unsubsidized exports of EU pork and poultry are both expected to rise throughout the projection period.

Livestock production in Hungary, which has been generally more intensive and larger scale than in Poland and in the Czech Republic, is expected to be able to meet the slowly growing domestic demand for meat and therefore Hungary will remain a net exporter of pork and poultry. Adequate meat supply growth keeps Hungarian prices below EU levels throughout the baseline. The smaller, less efficient scale of production in Poland and the Czech Republic, coupled with continued need for structural adjustment, hinders the ability of livestock producers in those countries to meet the rising demand for meat. Economic prosperity in the next decade is projected to stop the decline in Czech meat consumption and stabilize total meat demand at just over 108 kg per person. Likewise, Polish consumption of beef, pork, and poultry combined is anticipated to rise from 56.9 kg per person in 1999 to 65.1 kg per person in 2009. Meat prices in both countries are projected to increase relative to the EU, particularly beef prices. Czech net imports of meat are expected to increase 188 percent from 1999 to 2009, with the greatest growth occurring in beef and poultry imports. Polish broiler imports are projected to nearly double to 33 thousand metric tons (tmt) by 2009, while net exports of beef and pork are expected to decline slightly.

Reform of the CAP dairy regime was put off until 2005 in the Berlin Accord; therefore, unlike the reforms in other sectors, the decline in dairy intervention prices and quota expansion may not occur before accession of the first wave of CEECs. In the baseline, the simultaneous 1.5 percent increase in dairy quotas and the 15 percent reduction in butter and non-fat dry (NFD) milk powder intervention prices beginning in 2005 cause EU prices for all dairy products to decline substantially. Dairy processors are expected to shift more milk into cheese and whole milk powder (WMP) production as NFD and butter intervention stocks are released. Lower prices facilitate a more than 50 tmt expansion in EU cheese exports over the projection period, but butter and milk powder exports are hindered by export subsidy constraints and dwindling excess supplies.

Milk and dairy product output are projected to increase significantly in the Czech Republic, Hungary, and Poland. Hungary introduced a quota on milk deliveries in 1996,

which will limit the growth of Hungarian milk production to just over 300 tmt over the next decade. Czech milk production is projected to increase by a similar amount, derived primarily from increased productivity. Although Czech milk output is not currently subject to delivery quotas, rising feed costs dampen expected production increases. Poland's dairy sector is by far the largest of the CEECs. Dairy herds in Poland are typically small, and a substantial share of milk production is processed on the farm or sold fresh. Nevertheless, the potential for productivity improvements is large, and milk output is projected to increase by 3.3 mmt over the next decade. It is anticipated that most of the increase will be consumed domestically; however, Poland's annual exports of NFD are projected to average 108 tmt over the next decade.

Although the baseline levels do not directly impact the simulated response to enlargement of the EU, the relative price relationships established in the baseline and the policy assumptions maintained do influence the simulation outcomes. The next section looks more closely at the important changes in the baseline assumptions made to accommodate the accession of the three CEECs. The simulation impacts are then discussed in terms of their deviation from the baseline levels.

Enlargement

Policy Assumptions

Although the enlargement to include CEECs has been in the making for several years, implementation is still tentative. It is difficult to anticipate the specifics of the CAP policies that will be applied in the acceding countries; however, likely adjustments can be broken down into changes in domestic policies and changes in commercial policies. Looking first at domestic policies, one intent of the Berlin Accord reforms is to further decouple income support and production to limit budgetary outlays (European Commission 1999). As mentioned earlier, the extension of direct payments to producers in the new member countries remains a hotly debated issue. Our analysis assumes that compensatory payments, as outlined in the Berlin Accord, are not extended to farmers in the acceding countries in the first scenario. In the second scenario we relax this assumption. The FAPRI model does not explicitly model direct payments in the livestock

and dairy sectors because they are assumed to be completely decoupled. They simply translate into an income transfer without first-round efficiency implications. However, it is assumed that beef cattle numbers are influenced by the suckler cow and steer payments, and we do not allow cow inventories to fall below the number eligible for direct payments. Direct payments are included in the decisions of grain and oilseed producers to capture the impact of payments on the comparison gross revenues across crops.

In the first enlargement scenario we assume the new member countries will receive the quota allocations they have requested in their position papers. In the second scenario the milk production quota is based on historical output, similar to the process used for Austria, Finland, and Sweden when they joined the EU-12 in 1995. The FAPRI dairy model does not model deliveries, so we take average milk production less feed use in each country for the last three years prior to accession in 2003 as an approximation for the quota levels implemented in the CEECs. The quota is imposed on milk production less feed use, and over-quota production is subject to a levy. The EU milk quota applies to milk delivered for processing and bottling, so the approach taken in this paper is not entirely consistent with the actual quota scheme. When the majority of milk produced in a country is delivered for processing, there is very little difference in the outcome of the two approaches. However, in a country like Poland, where milk deliveries are less than 60 percent of production, placing the quota on production may produce a different result than placing it directly on deliveries. Our assumption implies that as Polish dairy producers improve quality, a higher percentage of milk will be delivered for processing, and milk processed on-farm or sold directly will decline by an equal amount. If, on the other hand, quotas are set based on current delivered quantities, structural adjustment and quality improvement in the dairy sector will be stifled once the quota level is reached. Using our approach, we avoid the undesirable outcome of institutionalizing the current high rate of on-farm processing by restricting deliveries to unreasonably low levels.

We assume that after accession the acceding countries will participate with the existing EU-15 countries in the forthcoming policy changes contained in the Berlin Accord. In the dairy industry, this means that the three countries will receive milk quota

increases of 1.5 percent starting in 2005, as do the EU-15 countries. We also assume that domestic prices and support prices in the new member countries will be harmonized with the EU-15.

Regarding trade policies, we assume that the tariff structure in the acceding CEECs is harmonized with the EU-15. The CEECs apply the EU common tariff to trade flows external to the EU-18, and there is free trade within the enlarged Union. In instances when tariffs in the CEECs must be raised to meet EU-15 levels, we assume that compensation arrangements will be made under Article XXIV of the Uruguay Round Agreement on Agriculture (URAA).⁵ Export subsidies are expected to continue in the new member states following accession. In most cases subsidized exports are expected to be at or near their volume or value maximums allowed under the URAA to reduce excess supplies. Table 2 summarizes the policy coverage and assumptions for the three acceding countries.

EU Enlargement Scenario Results

Using the FAPRI 2000 baseline as a reference for comparison, we simulate the impacts of the Czech Republic, Hungary, and Poland joining the EU. Tables 3 and 4 summarize the results for both scenarios in percentage change from the baseline for major crop and livestock products and their prices. More detailed results are available in the appendix tables, available on request.

Scenario 1 Results.

Crops. Implementation of EU market support measures in the new member countries causes wheat prices in Poland to rise between 6 and 12 percent, while prices in Hungary increase more than 50 percent. The higher prices stimulate a combined increase in wheat production of up to 2.1 mmt. Wheat demand declines in Hungary and Poland in response to higher wheat prices, and an excess supply of 1.3 to 3.2 mmt of wheat is shifted onto markets in the EU-15. Wheat prices in the EU-15 fall up to 4.9 percent, inducing grain producers in the EU-15 to shift area out of wheat and into barley and oilseeds. Consequently, wheat production declines an average of 0.4 percent in the original 15 member countries. Lower domestic prices allow some of the additional wheat

TABLE 2. Grain and dairy sector policy assumptions

	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Scenario 2							
Base Area Harvested	(Thousand Hectares)						
EU-15	49,706	49,706	49,706	49,706	49,706	49,706	49,706
Czech Republic	3,105	3,105	3,105	3,105	3,105	3,105	3,105
Hungary	4,712	4,712	4,712	4,712	4,712	4,712	4,712
Poland	10,886	10,886	10,886	10,886	10,886	10,886	10,886
Set-Aside Area							
EU-15	4,105	4,105	4,105	4,105	4,105	4,105	4,105
Czech Republic	238	239	240	240	241	242	242
Hungary	361	363	364	365	366	367	368
Poland	355	366	377	388	398	409	419
Small Farm Share	(Percent)						
Czech Republic	23.30	24.30	25.30	26.30	27.30	28.30	29.30
Hungary	23.30	23.07	22.84	22.61	22.38	22.16	21.94
Poland	67.34	66.33	65.34	64.36	63.39	62.44	61.51
Dairy Quotas							
EU	(Million Metric Tons)						
Baseline	118.88	118.88	119.36	119.84	120.32	120.32	120.32
Scenario 1	118.88	118.88	119.36	119.84	120.32	120.32	120.32
Scenario 2	118.88	118.88	119.36	119.84	120.32	120.32	120.32
Czech Republic							
Baseline	0	0	0	0	0	0	0
Scenario 1	3.04	3.04	3.06	3.07	3.09	3.09	3.09
Scenario 2	2.34	2.34	2.35	2.37	2.38	2.38	2.38
Hungary							
Baseline	1.86	1.86	1.86	1.86	1.86	1.86	1.86
Scenario 1	2.65	2.65	2.66	2.68	2.69	2.69	2.69
Scenario 2	1.86	1.86	1.87	1.88	1.89	1.89	1.89
Poland							
Baseline	0	0	0	0	0	0	0
Scenario 1	11.22	11.22	12.06	12.90	13.74	13.74	13.74
Scenario 2	11.91	11.91	11.97	12.02	12.08	12.08	12.08

EU wheat net exports to non-EU countries increase by 0.8 to 1.7 mmt, an average increase of 7.4 percent. Wheat net exports from Hungary to non-member countries decline more than 900 tmt, as domestic wheat prices rise to the EU level. However, a significant diversion of Polish and Czech wheat imports from nonmember countries to EU markets virtually offsets the change in Hungarian trade, leaving the combined extra-EU wheat trade for the three CEECs within 100 tmt of the baseline level. Consequently, international wheat markets are only moderately impacted. Prices for U.S. wheat at the Gulf decline an average of 1.1 percent over the projection period.

After accession, coarse grain prices in the CEECs generally move in the same direction as wheat prices. Production of corn and barley in Hungary increases an average of 9.2 and 25.2 percent, respectively. Domestic corn consumption in Hungary declines an average of 4.1 percent, creating an excess supply of up to 2.3 mmt that is released onto EU markets. Poland and the Czech Republic absorb an average of 162 tmt of Hungarian corn, but the bulk of Hungary's intra-EU exports is placed on markets in the EU-15, pushing EU corn prices more than 8 percent below the baseline. Hungarian corn exports to non-EU countries decline an average of 1.4 mmt. EU corn imports from non-member countries decline an average of 348 tmt. International corn markets feel only a minor impact from the changes in the EU. The U.S. price of corn at the Gulf declines an average of \$0.30 per ton.

EU barley prices also decline following accession, but the changes are smaller than in wheat and corn markets because baseline barley price projections are very close to the intervention price. Consequently, barley area in the EU-15 rises marginally above the baseline, as EU producers shift area away from wheat and corn. Higher feed prices and lower livestock prices prompt a reduction in the output of meat products in Poland. Declines in Polish livestock production diminish barley feed demand an average of 14.9 percent relative to the baseline, enabling Poland to become a net exporter of barley to the EU. On the contrary, falling feed prices and generous dairy quotas encourage a moderate increase in beef and poultry production in the Czech Republic. Czech barley feed use increases 11 percent over the baseline, and Czech barley imports from EU members

average just over 500 tmt. EU-15 barley exports to non-member countries increase an average of 433 tmt, depressing world barley prices 1.9 percent.

Livestock and poultry. Driven by a 24.4 percent increase in dairy cows, cattle stock, total cattle slaughter, and production increase significantly in the Czech Republic, even though beef prices decline by 34.5 percent. Consumption rises by 5.4 percent. As a result, the Czech Republic's total net trade position changes from an importer to an exporter status (a change of 13 tmt). Its net imports from the expanded EU-15 decline, and the Czech Republic becomes a net exporter to third countries with its lower price and higher tariffs imposed on third country imports.

An opposite price pattern is shown in Hungary with beef prices rising by 66.9 percent, while feed grain prices rise by 58 to 81 percent. Primarily driven by the dairy cow stock increase of 40.4 percent, total cattle stock, slaughter and production increase significantly, while consumption drops by 11 percent. Hungary is a net exporter of beef throughout the simulation period, increasing its net exports by 32 tmt, all of it going to the expanded EU-18.

On the other hand, the price of beef in Poland rises in the first three years of accession, then falls in the remaining five years of the simulation period. With dairy cow numbers declining by 5.7 percent, a 5 percent decline is also shown in total cattle stock, slaughter, and production. Beef consumption rises 2.7 percent above the baseline level in 2010. After accession, Polish exports rise 9 tmt in the period when prices are increasing, then fall 38 tmt when prices are decreasing. Poland's imports from the EU-18 increase in the outer years, reaching 40 tmt in 2010, while exports to third country destinations rise slightly (2 tmt) as a result of lower prices and higher protection after accession.

Intra-EU-18 net exports from the acceding countries rise 27 tmt in the first three years and 13 tmt in the last five years. As a result, the EU-18 beef price first decreases when there is an excess supply of beef in the first two years, then increases in the following three years as Poland demands more beef, and finally falls in the outer years. In the original EU-15, beef production and consumption are virtually unchanged. Effects on the world beef market are small. A combination of the higher excess supply to third countries coming from the expanded EU-18 and the increased production in some

importing countries stimulated by lower feed grain prices drive the world beef price down by less than 1 percent. Exports from the United States and other exporters decrease, resulting in slightly lower world trade (also less than 1 percent).

With a 27.4 percent drop in pork prices in the Czech Republic, swine stock, slaughter, and production decline slightly, while consumption rises by 2 percent. The Czech Republic's pork imports increase by 35 tmt with all of it coming from the expanded EU-18. However, as a result of the lower prices and higher protection after accession, the Czech Republic's pork net trade to third country destinations increases 5 tmt.

Although prices of all meats increase in Hungary, the price of pork increases the least, by 3.2 percent. However, much larger price increases for feed grains cause swine stock, slaughter, and production to decline by about 12 percent. Pork consumption increases by about 1 percent. Hungary changes from being a net exporter to being a net importer of pork, with imports of 66 tmt coming mostly from the expanded EU-18. Hungary shows a slight increase in third country exports, with higher protection more than compensating for the higher price of pork after accession.

Pork prices in Poland increase in the first two years, then decline for the remaining six years. The average decline in the pork price is 1 percent. Swine stock, slaughter and production decrease proportionally. Pork consumption declines after accession, initially because of the higher pork price, and then because of substitution toward beef and broiler meat in response to relative price changes. In the first two years, Poland imports less from the expanded EU-18, but as the Polish pork price falls, Poland imports up to 72 tmt from the expanded EU-18. The original EU-15 face a higher demand for pork imports in the CEECs (new level of 124 tmt), exerting a small upward pressure on price, and output of less than 1 percent.

Even though broiler prices in the Czech Republic decline by 17.2 percent, production increases by 18.6 percent, because of the sharp decline in feed grain prices. The demand for broilers shifts inward in response to lower prices for beef and pork. The net effect is a small increase in broiler consumption of 0.4 percent. As a result, the Czech Republic is able to ship 36 tmt of broiler meat to the expanded EU-18.

By contrast, broiler prices in Hungary increase 28.83 percent, which is not high enough to compensate the larger increases in feed grain prices. Production drops 3.6 percent and consumption declines 2.3 percent. Hungary's net exports decrease by 4 tmt to both the expanded EU-18 and third country destinations.

Broiler production in Poland drops 29.7 percent because of the combined impact of broiler price decline (-10.6 percent) and higher feed grain cost. Consumption rises 3.2 percent, prompting total broiler imports to grow to 129 tmt in 2010, most of which come from the expanded EU-18.

The rise in broiler import demand in the three CEECs is more than offset by the 1.2 percent increase in broiler production in the EU-15. The EU broiler price declines -0.7 percent. EU-15 consumption rises by 0.2 percent, and exports to the three CEECs expand by 67 tmt, while exports to third country destinations increase by only 3 tmt. The impact of accession on the world broiler market is negligible.

Dairy. Two key features of EU dairy policy shape much of the impact of EU enlargement on the dairy sector. First, each of the new member countries is assumed to implement the supply management system that currently exists in the EU-15. Milk delivery quotas limit the supply response to the rise in dairy prices in the CEECs following accession. Second, the accession occurs in 2003, before the implementation of the Agenda 2000 reforms in the dairy sector. Consequently, dairy prices are supported at fairly high levels the first two years after accession. Moreover, the CEECs are assumed to participate in the quota expansion that begins in 2005.

As mentioned above, we assume in scenario 1 that dairy quotas in the new member countries are initially set at the volumes requested in their recent position papers. The quota in the Czech Republic is set at 3.1 billion liters, in Hungary at 2.7 billion liters, and in Poland at 11.217 mmt. The quota levels are allowed to grow from 2005-2007, reaching their maximum levels in 2008 at 3.15 billion liters, 2.74 billion liters, and 13.74 mmt for the Czech Republic, Hungary, and Poland, respectively.

The introduction of generous production quotas, in conjunction with dairy product price increases in excess of 30 percent, results in a 25.5 and 40.6 percent expansion of milk production in the Czech Republic and Hungary, respectively. All of the increase in

milk output is channeled into the production of cheese, milk powder, butter, and other manufactured dairy products. Domestic consumption of fluid milk declines by 4.3 to 6.6 percent on average in three CEECs, and consumption of butter and cheese decreases between 2.5 and 6 percent. Consequently, excess supplies of dairy products swell in the Czech Republic and Hungary, particularly supplies of butter and cheese. The increase in domestic prices makes it more difficult to export excess dairy products outside of the expanded union. The model assumes the Czech Republic will fully utilize its export subsidies allowed under the URAA to limit the decline in butter exports and to moderately expand NFD net exports. Despite these efforts, Czech net exports of butter and cheese to EU member countries average 21 and 45 tmt, respectively. Likewise, Hungarian butter and cheese net exports within the EU are projected to average 12 and 86 tmt, respectively.

Accession has a negative impact on Polish milk production. The initial milk quota level requested by the Poles is lower than production levels in the latter half of the 1990s. Thus, imposition of the quota keeps Polish milk production an average of 4.3 percent below the baseline production. Production of all dairy products is also moderately below the baseline for much of the simulation period, but reduction in domestic consumption offsets the production declines in most years. The increase in domestic NFD prices reduces Polish exports to non-member countries by 97 tmt on average. We assume that the Polish government subsidizes NFD exports to the maximum value allowed under the URAA, but the substantial difference between EU support prices and world prices keeps Polish NFD exports below 20 tmt. The excess supply of NFD is either stockpiled in Poland or placed on markets in the EU. Polish net exports of NFD to the EU averages 60 tmt, and Polish NFD stocks expand to a record 246 tmt by 2009.

Dairy product markets in the EU-15 are oversupplied, and there is pressure to reduce prices. Intervention support measures keep butter and NFD prices from falling significantly below the baseline, particularly in the first five years of the simulation period. Butter stocks increase an average of 21 tmt annually, pushing total stocks to 478 tmt by 2009. NFD stocks increase an average of 46 tmt annually, amounting to more than a six-fold increase in total stocks over the baseline. Despite excess supply on the

domestic market, EU-15 NFD production increases 2.1 percent over the baseline because cheese prices fall relative to the NFD price. EU cheese prices fall 1.9 to 4.6 percent following accession, and cheese production in the EU-15 falls 1.3 percent below the baseline level. The decline in domestic cheese prices promotes unsubsidized cheese exports, allowing EU-15 net cheese trade to grow 13.4 percent relative to the baseline. EU-15 butter net exports also increase slightly, and NFD exports are pushed to the GATT maximum.

In general, world dairy markets are only moderately impacted by the enlargement of the EU. Free-on-board (FOB) Northern European prices for butter and cheese decline 0.4 and 1.2 percent, respectively, in response to increased exports from the EU and other countries. World NFD prices, however, increase 4.3 percent as a consequence of the dramatic decline in Polish NFD exports. The EU, Czech Republic, and New Zealand expand NFD exports to replace Polish shipments.

Scenario 2 Results.

Crops. In this second scenario we assume that grain producers in the new member countries receive both CAP market price support measures and direct producer payments. In return for the direct payments, producers must set aside 10 percent of their base area. In order to implement the producer payment and set-aside policies, base acreage must be determined. A consensus between the EU and the CEECs does not currently exist regarding the method for calculating producer compensation and set-aside in the new member states in the event that these policies are implemented. The EU Commission has suggested using 1995-1999 as the reference period and throwing out the high and low years when computing average values (USDA, 2000). We adopt this reference period and method of averaging to compute the base area for the CEECs from actual harvested area. Base areas in the Czech Republic, Hungary, and Poland were determined to be 3.11, 4.71, and 10.89 million hectares (mha), respectively.

Current CAP regulations require producers who receive direct area payments to set aside as fallow a specific percentage of their base acreage. The FAPRI baseline assumes that the set-aside rate is held constant throughout the projection period at the minimum 10 percent. Producers raising less than 92 tons of cereals are exempt from the set-aside

requirement. Using wheat and barley producers as the representative small farm, the 92-ton limit suggests that a small farm in the CEECs has approximately 20 hectares of arable land. In 1996 roughly 25 percent of agricultural land in the Czech Republic was farmed by individual producers who cultivated small plots typically less than 30 hectares (European Commission, 1998a). We assume that as producers continue to adjust to changing market conditions, the number of small producers will continue to decline at a rate of 1.0 percent annually. By 2009 small farms in the Czech Republic are assumed to cultivate 21.9 percent of the country's arable land. Based on farm survey data, 72 to 76 percent of the arable land in Hungary in the mid 1990s was farmed by producers or cooperatives with more than 50 hectares of agricultural land (Burgerné Gimes et al.). The structure in Hungary appears to be very similar to that in the Czech Republic, so we assume in the scenario that the farm structure in Hungary evolves in the same manner as in the Czech Republic. In Poland, farmland is much more fragmented than in the other CEECs. According to an EU Commission report, farms holding less than 20 hectares of arable land cultivated 76 percent of utilized agricultural area in Poland in 1996 (European Commission, 1998b). The report also suggests that farms with less than 15 hectares of arable land will still cultivate roughly 60 percent of Polish agricultural land in 2005. Consequently, we assume that the share of agricultural land cultivated by small farms in Poland declines at a rate of 1.5 percent annually. By 2009, farms less than 20 hectares in size are assumed to cultivate 61.5 percent of Polish arable land.

Given our assumptions about base area, set-aside rates, and the share of area held on small farms, we compute the total set-aside area as follows:

$$\text{Set Aside} = \text{Base Area} * 0.10 * (1 - \text{share of area held on small farms}).$$

The set-aside requirement influences production by reducing harvested area. The set-aside area is subtracted from the base area, and the remaining area is shared out across cereal and oilseed crops according to relative changes in gross revenues.

Introducing the set-aside requirement dampens the increase in Polish and Hungarian wheat production following accession. Relative to the baseline, Hungarian and Polish wheat production increase by 8.1 percent and 9.2 percent, respectively. Nevertheless, the combined increase is an average of 694 tmt lower than in the first scenario, with 60

percent of the reduction occurring in Hungary. The decrease in Polish and Hungarian wheat production reduces their exports to the EU-15 and the Czech Republic by 510 tmt relative to scenario 1. More than 400 tmt of the change is offset by a reduction in Czech imports. Slightly higher domestic wheat production and lower feed use reduce Czech wheat imports below 100 tmt by 2007. Consequently, EU-15 wheat imports from the CEECs are within 100 tmt of the scenario 1 levels, and EU wheat prices still decline more than 4 percent relative to the baseline. World wheat prices decline an average of 0.9 percent relative to the baseline following accession.

Both corn and barley production is negatively impacted by the land constraints in Hungary and Poland. Hungarian corn harvested area declines an average of 89 thousand hectares relative to scenario 1, which translates into a 542 tmt reduction in corn production. Hungarian corn exports to EU member countries average 1.8 mmt following accession, nearly 600 tmt higher than the baseline. However, in the second scenario, levels are 43 percent lower than they are in scenario 1. EU corn prices fall an average of 5.2 percent below their baseline levels, and world corn markets are virtually unaffected. The scenario 2 impacts on barley markets originate primarily in the livestock sector. The lower dairy quota level in the Czech Republic reduces dairy cow numbers and fed cattle production. Czech barley feed demand falls 4.7 percent below the baseline. Czech barley imports from EU members remain below 200 tmt throughout the projection period, an average of 26 tmt less than in the baseline. Consequently, EU-15 imports of barley from the CEECs rise in scenario 2 an average of 172 tmt above the levels in scenario 1, and the EU domestic market price for barley falls 2.6 percent below the baseline. EU barley exports increase an average of 438 tmt, pulling down world barley prices 1.9 percent.

Livestock and Poultry. The greatest impact on livestock in this scenario is caused by a reduction of the dairy cow numbers due to the more restrictive milk quotas. Slower growth in the dairy cow inventory in the Czech Republic and Hungary and a 10.3 percent decline in dairy cows in Poland reduce beef supply in the three CEECs. Beef imports increase by 62 tmt in the second half of the simulation period. The higher beef import demand creates an upward pressure on the beef price in the EU-18, causing it to rise by

0.9 percent. Beef production for the EU-15 remains essentially unchanged while consumption drops 0.2 percent.

Two opposing effects drive the changes in the pork and poultry sectors in scenario 2. Higher feed grain prices penalize these industries, but demand for pork and poultry increases as consumers substitute away from beef, because of its relatively higher price. The net effect of these opposing forces on poultry and pork production is positive but small in the Czech Republic and Poland, and negative in Hungary, relative to the levels attained under scenario 1.

Pork and poultry imports in the three CEECs decline slightly compared to scenario 1. Most of the pork and poultry production increase in the EU-15 is consumed locally, as consumers substitute away from beef.

Dairy. In the second scenario we assume the dairy quota levels in the CEECs are based on milk production projected in the baseline from 2000 to 2002. The exception is Hungary, where a quota on deliveries was instituted in 1996. In Hungary, we assume the quota remains at the current level of 1.9 billion liters. The quota in the Czech Republic is set at 2.34 mmt, and the Polish quota level is assumed to be 11.9 mmt.

Dairy product price changes in the CEECs following accession are essentially the same in scenarios 1 and 2, but the more restrictive quotas in the second scenario substantially reduce the excess supply of dairy products in the CEECs. Milk production in the Czech Republic is projected to increase 2.5 percent over the baseline from 2003 to 2008, but it falls below the baseline the last two years of the projection period. Czech exports of butter and cheese to EU member countries in scenario 2 average 11 and 19 tmt, respectively, down from 21 and 45 tmt in scenario 1. Similarly, Hungarian milk production averages just 3.6 over the baseline level. Hungarian butter and cheese exports within the EU are down in scenario 2 from the quantities in scenario 1 by more than 70 percent to 3 and 24 tmt, respectively.

The Polish milk quota in scenario 2 is less restrictive than the quota in scenario 1 in the first two years because the quota requested by the Polish government is initially below historical production levels. However, the Polish proposal used in this scenario dictates that the quota will gradually increase until 2008. Consequently, the milk quota in

scenario 2 is progressively more restrictive toward the end of the projection period. By 2009, Polish milk production is 15.7 percent below the baseline and 11.1 percent below scenario 1. With less milk available, NFD stocks peak at 208 tmt, and NFD exports to the EU average 56 tmt.

Fewer imports of dairy products from the CEECs improve EU-15 prices in scenario 2 relative to scenario 1. Cheese prices decline less than 1 percent for the first five years of the simulation period and decline just 2.7 percent by 2009. Butter and NFD price changes are similar to scenario 1 because prices are still supported at the intervention levels. Consequently, butter and NFD stock accumulate, but stocks reach their maximum levels in 2005 and decline gradually for the remainder of the simulation. By 2009, butter stocks are 40 percent above the baseline, and NFD stocks, at 351 tmt, are nearly four times the baseline level.

World butter and cheese prices decrease less than 0.5 percent on average. Cheese prices fall 1.1 percent below the baseline in 2009. The FOB Northern Europe NFD price is also slightly higher in the second scenario than in scenario 1. Reduced NFD production lowers subsidized NFD exports from the Czech Republic. Australia and New Zealand increase exports 7.6 and 5.5 percent above the baseline to meet the excess demand on world markets.

TABLE 3. Production of major crops and livestock products

	EU-15		Czech Republic		Hungary		Poland	
	2004/05	2009/10	2004/05	2009/10	2004/05	2009/10	2004/05	2009/10
	Thousand Metric Tons							
Baseline								
Wheat	103,687	111,273	4,271	4,392	4,781	4,861	9,114	9,649
Corn	36,687	38,509	165	169	6,845	7,085	567	652
Barley	52,858	54,641	2,197	2,188	1,381	1,568	3,885	4,057
Beef	7,737	7,554	221	219	71	73	379	414
Pork	18,183	18,451	663	661	496	505	1,799	1,887
Broiler	6,316	6,650	191	203	236	243	374	437
Cheese	6,190	6,512	77	78	65	71	172	190
Butter	1,736	1,726	77	80	17	18	189	208
NFD	1,084	1,020	50	56	9	10	126	160
Scenario 1	Percent Change from Baseline							
Wheat	-0.1	-0.7	-0.8	1.8	9.5	17.6	6.5	13.4
Corn	-1.1	-1.7	49.7	85.9	9.3	9.4	10.6	9.9
Barley	0.3	0.7	0.0	0.2	23.3	27.6	1.0	-0.1
Beef	0.0	0.0	7.0	17.1	22.1	45.8	0.5	-3.9
Pork	0.3	0.9	-3.2	0.7	-7.3	-19.3	0.0	-3.1
Broiler	1.0	1.3	19.7	22.7	-5.6	-6.6	-28.7	-30.5
Cheese	-1.6	-1.1	45.5	41.6	141.4	111.7	-4.9	0.7
Butter	0.5	0.3	13.5	11.0	75.8	58.0	-3.6	-4.5
NFD	2.5	1.7	27.3	19.6	73.5	46.5	-8.8	-10.7
Scenario 2								
Wheat	-0.2	-0.7	0.1	3.4	1.7	8.1	4.7	9.2
Corn	-0.4	-1.1	51.2	88.0	2.0	1.4	7.2	3.8
Barley	0.1	0.6	2.1	2.4	16.5	19.4	0.5	-2.1
Beef	0.0	0.2	-1.2	-1.5	8.7	10.1	3.5	-14.8
Pork	0.3	0.9	-3.1	1.1	-7.4	-19.5	0.1	-2.9
Broiler	1.0	1.5	20.2	23.4	-5.9	-7.1	-28.3	-29.8
Cheese	-0.5	0.2	10.6	8.0	43.4	19.1	0.0	-7.2
Butter	0.1	-0.1	0.6	-1.6	21.3	6.3	-0.4	-11.6
NFD	0.8	-0.8	-1.1	-6.6	17.8	-3.1	0.1	-28.1

TABLE 4. Producer prices of major crops and livestock products

	EU-15		Czech Republic		Hungary		Poland	
	2004/05	2009/10	2004/05	2009/10	2004/05	2009/10	2004/05	2009/10
	Euros per Metric Ton							
Baseline								
Wheat	113	120	171	196	72	72	102	103
Corn	113	116	147	166	59	62	84	81
Barley	105	101	158	182	65	74	102	108
Beef	2,081	2,029	3,094	3,165	1,212	1,279	1,853	2,311
Pork	1,165	1,256	1,638	1,671	1,123	1,230	1,153	1,310
Poultry	1,099	1,198	1,273	1,514	846	927	1,242	1,299
Cheese	4,619	4,257	2,213	2,201	3,096	3,079	2,916	2,883
Butter	3,288	2,862	2,010	1,950	2,267	2,253	2,290	2,205
NFD	2,053	1,825	1,067	1,127	1,435	1,452	1,296	1,379
Scenario 1	Percent Change from Baseline							
Wheat	-3.8	-4.9	-36.1	-41.7	52.1	58.2	6.9	11.3
Corn	-6.0	-8.4	-27.8	-36.0	79.6	72.6	26.9	31.7
Barley	-1.8	-2.1	-34.5	-45.6	58.4	34.6	0.9	-7.9
Beef	-1.2	-1.3	-33.6	-36.8	69.6	56.5	10.9	-13.4
Pork	0.3	-0.2	-28.6	-25.0	4.1	1.9	1.4	-4.3
Poultry	-0.2	-1.3	-13.8	-21.8	29.6	27.6	-11.7	-8.9
Cheese	-1.9	-4.6	104.8	84.5	46.4	31.9	55.5	40.9
Butter	-0.1	-2.5	63.4	43.1	44.9	23.9	43.5	26.6
NFD	0.0	-4.2	92.4	55.2	43.0	20.4	58.4	26.8
Scenario 2								
Wheat	-3.9	-4.4	-36.2	-41.4	51.9	59.1	6.7	11.9
Corn	-4.9	-5.8	-26.9	-34.2	81.6	77.5	28.3	35.5
Barley	-2.7	-2.5	-35.2	-45.9	56.9	33.9	-0.1	-8.3
Beef	-0.6	2.8	-33.2	-34.1	70.7	63.0	11.6	-9.7
Pork	0.5	0.3	-28.5	-24.6	4.3	2.4	1.6	-3.8
Poultry	-0.1	-0.8	-13.7	-21.5	29.8	28.3	-11.5	-8.5
Cheese	-0.6	-2.7	107.5	88.2	48.3	34.5	57.5	43.6
Butter	0.0	-1.8	63.5	44.2	45.0	24.8	43.5	27.5
NFD	0.0	-4.2	92.5	55.1	43.0	20.4	58.4	26.8

Concluding Remarks

We used a world agricultural multimarket model to analyze the consequences of EU enlargement to include the Czech Republic, Hungary, and Poland. We produced a market outlook up to 2010 for two enlargement scenarios, which were based on different assumptions regarding the restrictions on grain and dairy production in the acceding countries. In both scenarios, accession of the three CEECs would lead to a permanent but moderate decrease in EU prices for most of the commodities. For the three acceding CEECs, domestic prices of many commodities would increase dramatically. Their final consumption of agricultural products would decrease in most instances, while production would rise. The first important conclusion emerging from our investigation is an unpalatable one: consumers would face increased food prices in the acceding countries.

Higher domestic prices in the CEECs would reduce exports of most commodities to non-union countries—a case of trade diversion. Consequently, excess supplies would be placed in stocks or exported to the original 15 member countries. Exports from third countries to the CEECs are also impacted but the magnitude of the diversion is moderate for grains and almost negligible for meat products. The impact of enlargement on world agricultural markets is limited as a result. In sum, trade effects are mostly within the enlarged Union.

The imposition of supply management mechanisms in the dairy and grain sectors would reduce the anticipated buildup of surpluses in the new member states. For example, under the first scenario, which assumed that the dairy quotas are set at the levels requested by the CEECs, a dairy glut occurs in Hungary and the Czech Republic. However, supply constraints would limit the ability of the new members to take advantage of the expanded market. The projected increase in inventory in our simulations makes it clear that further changes in the CAP will be necessary with enlargement or that CEECs will have to accede under unfavorable terms to contain the potential output expansion.

Endnotes

1. A companion paper (Fuller et al.) provides a preliminary assessment of the impact of the Berlin agreement and enlargement to CEECS on dairy markets based on a previous world outlook.
2. Reviewers of an earlier draft of this report suggested that the FAPRI baseline prices did not represent a likely scenario in the medium term, particularly in the Czech Republic. The reviewers expect prices in the three CEECs to remain fairly close to one another and to remain below prices in the EU even after accession. Accommodating this criticism would have a significant impact on the results for the Czech Republic, raising domestic prices following accession and increasing exports to the EU-15.
3. Prices for 1997 were obtained from the European Commission agricultural situation reports (European Commission 1998a; 1998b; 1998c), and the 2002 price projections were obtained from the *FAPRI 2000 World Agricultural Outlook*. The 1997 cheese and butter prices for Hungary and cheese prices for the Czech Republic are estimated (Australian price converted in local currency plus tariff).
4. The FAPRI modeling system has been documented in a series of technical reports published by the Center for Agriculture and Rural Development.
5. Leetma et al. employ a similar assumption in their enlargement analysis.

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Appendix

Country and Sector Results

TABLE A.1. Impacts of EU enlargement on EU wheat

	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Area Harvested	(Million Hectares)						
Baseline	16.59	16.61	16.64	16.65	16.68	16.70	16.74
Scenario 1 Change (%)	-0.03	-0.15	-0.43	-0.42	-0.52	-0.56	-0.70
Scenario 2 Change (%)	-0.03	-0.17	-0.40	-0.41	-0.52	-0.60	-0.61
Production	(Million Metric Tons)						
Baseline	102.23	103.69	105.20	106.59	108.18	109.57	111.27
Scenario 1 Change (%)	0.04	-0.15	-0.45	-0.40	-0.51	-0.54	-0.75
Scenario 2 Change (%)	0.04	-0.22	-0.48	-0.44	-0.58	-0.66	-0.69
Feed Use							
Baseline	40.08	40.59	40.80	41.15	41.54	41.86	42.24
Scenario 1 Change (%)	0.47	0.69	0.72	0.86	0.81	0.91	0.86
Scenario 2 Change (%)	0.42	0.63	0.63	0.77	0.74	0.74	0.80
Food Use							
Baseline	46.35	46.39	46.41	46.42	46.41	46.39	46.36
Scenario 1 Change (%)	-0.13	-0.15	-0.19	-0.23	-0.22	-0.19	-0.21
Scenario 2 Change (%)	-0.05	-0.11	-0.13	-0.16	-0.14	-0.13	-0.13
Ending Stocks							
Baseline	20.62	22.32	23.88	25.03	26.02	26.12	26.03
Scenario 1 Change (%)	0.71	0.94	1.22	1.44	1.97	2.05	2.02
Scenario 2 Change (%)	0.59	1.00	1.11	1.36	1.44	1.49	1.67
Net Trade							
Baseline	13.29	15.00	16.43	17.87	19.24	21.21	22.77
Scenario 1 Change (%)	5.49	5.78	5.23	6.72	6.63	7.18	6.83
Scenario 2 Change (%)	4.49	5.50	5.36	6.33	6.30	6.23	6.11

TABLE A.2. Impacts of EU enlargement on EU corn

	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Area Harvested	(Million Hectares)						
Baseline	4.07	4.07	4.07	4.07	4.06	4.06	4.05
Scenario 1 Change (%)	0.07	-1.09	-1.16	-1.49	-1.90	-1.85	-1.67
Scenario 2 Change (%)	0.07	-0.38	-0.73	-0.94	-1.23	-1.13	-1.10
Production	(Million Metric Tons)						
Baseline	36.34	36.69	37.11	37.44	37.80	38.18	38.51
Scenario 1 Change (%)	0.07	-1.09	-1.16	-1.49	-1.90	-1.85	-1.67
Scenario 2 Change (%)	0.07	-0.38	-0.73	-0.94	-1.23	-1.13	-1.10
Feed Use							
Baseline	29.18	29.33	29.30	29.39	29.44	29.54	29.61
Scenario 1 Change (%)	0.97	0.94	1.22	1.49	1.41	1.22	1.27
Scenario 2 Change (%)	0.40	0.58	0.77	0.96	0.86	0.84	0.80
Food and Other							
Baseline	9.34	9.45	9.57	9.71	9.86	10.05	10.24
Scenario 1 Change (%)	0.57	0.45	0.66	0.80	0.74	0.53	0.59
Scenario 2 Change (%)	0.11	0.20	0.34	0.42	0.32	0.29	0.22
Ending Stocks							
Baseline	4.16	4.49	5.00	5.48	6.06	6.71	7.37
Scenario 1 Change (%)	11.08	14.08	15.22	11.03	5.99	4.19	3.18
Scenario 2 Change (%)	6.41	9.05	8.87	6.57	4.71	5.07	5.12
Net Trade							
Baseline	-2.43	-2.41	-2.27	-2.15	-2.08	-2.06	-2.00
Scenario 1 Change (%)	-43.55	-46.45	-51.11	-57.15	-56.58	-55.06	-56.91
Scenario 2 Change (%)	-39.59	-44.71	-47.76	-52.09	-50.78	-49.77	-52.79

TABLE A.3. Impacts of EU enlargement on EU barley

	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Area Harvested	(Million Hectares)						
Baseline	11.25	11.21	11.18	11.12	11.08	11.05	11.02
Scenario 1 Change (%)	0.10	0.26	0.26	0.33	0.46	0.59	0.69
Scenario 2 Change (%)	0.10	0.11	0.06	0.14	0.35	0.49	0.54
Production	(Million Metric Tons)						
Baseline	52.50	52.86	53.26	53.55	53.89	54.27	54.64
Scenario 1 Change (%)	0.10	0.26	0.26	0.33	0.46	0.59	0.69
Scenario 2 Change (%)	0.10	0.11	0.06	0.14	0.35	0.49	0.54
Feed Use							
Baseline	31.54	31.72	31.73	31.83	31.91	31.95	31.97
Scenario 1 Change (%)	0.12	0.50	0.48	0.43	0.44	0.41	0.51
Scenario 2 Change (%)	0.23	0.75	0.76	0.65	0.71	0.74	0.71
Food and Other							
Baseline	10.55	10.60	10.65	10.70	10.75	10.80	10.84
Scenario 1 Change (%)	0.01	0.14	0.12	0.12	0.11	0.11	0.14
Scenario 2 Change (%)	0.04	0.21	0.20	0.17	0.18	0.18	0.17
Ending Stocks							
Baseline	8.09	8.02	8.07	8.19	8.42	8.85	9.47
Scenario 1 Change (%)	0.05	0.95	1.03	1.21	1.25	1.47	1.60
Scenario 2 Change (%)	0.16	1.59	1.35	1.60	1.77	1.77	1.70
Net Trade							
Baseline	10.48	10.61	10.83	10.91	11.01	11.10	11.21
Scenario 1 Change (%)	-0.22	0.29	1.91	2.53	3.07	3.37	3.27
Scenario 2 Change (%)	-0.21	0.33	1.95	2.53	3.11	3.43	3.36

TABLE A.4. Impacts of EU enlargement on grain prices

	03/04	04/05	05/06	06/07	07/08	08/09	09/10
European Union							
Wheat Domestic Price	(Euro per Ton)						
Baseline	111.98	113.34	114.29	115.94	116.55	118.63	119.97
Scenario 1 Change (%)	-1.53	-3.76	-3.73	-4.49	-4.29	-4.85	-4.89
Scenario 2 Change (%)	-1.51	-3.92	-3.77	-4.25	-4.21	-4.09	-4.36
Corn Domestic Price							
Baseline	112.05	113.17	113.44	114.16	114.61	115.14	115.98
Scenario 1 Change (%)	-4.27	-5.99	-7.09	-8.73	-8.33	-7.94	-8.40
Scenario 2 Change (%)	-2.06	-4.90	-5.50	-6.46	-6.00	-5.81	-5.78
Barley Domestic Price							
Baseline	105.49	105.05	103.79	102.95	102.00	101.53	101.24
Scenario 1 Change (%)	-0.10	-1.75	-1.62	-1.58	-1.60	-1.60	-2.09
Scenario 2 Change (%)	-0.53	-2.72	-2.68	-2.35	-2.54	-2.61	-2.55
Czech Republic							
Wheat Domestic Price	(Koruny per Ton)						
Baseline	6,182	6,441	6,717	6,992	7,270	7,547	7,832
Scenario 1 Change (%)	-33.5	-36.1	-37.5	-38.8	-40.0	-40.8	-41.7
Scenario 2 Change (%)	-33.5	-36.2	-37.5	-38.7	-40.0	-40.4	-41.4
Barley Domestic Price							
Baseline	5,726	5,945	6,187	6,437	6,707	6,986	7,297
Scenario 1 Change (%)	-31.4	-34.5	-37.0	-39.2	-41.5	-43.4	-45.6
Scenario 2 Change (%)	-31.7	-35.2	-37.7	-39.7	-42.1	-44.0	-45.9
Hungary							
Wheat Domestic Price	(Florint per Ton)						
Baseline	21,858	22,094	22,631	23,126	23,638	24,138	24,670
Scenario 1 Change (%)	52.3	52.1	53.0	53.8	54.8	56.6	58.2
Scenario 2 Change (%)	52.3	51.9	52.9	54.2	54.9	57.9	59.1
Barley Domestic Price							
Baseline	19,493	20,076	21,022	21,929	22,964	23,980	25,195
Scenario 1 Change (%)	63.2	58.4	52.8	48.5	43.4	39.6	34.6
Scenario 2 Change (%)	62.5	56.9	51.2	47.3	42.0	38.1	33.9
Poland							
Wheat Domestic Price	(Zlotys per Ton)						
Baseline	534,008	540,070	553,515	565,950	578,829	591,456	604,888
Scenario 1 Change (%)	6.9	6.9	7.5	8.1	8.9	10.2	11.3
Scenario 2 Change (%)	6.9	6.7	7.5	8.4	9.0	11.1	11.9
Barley Domestic Price							
Baseline	530,643	541,393	558,636	575,205	594,088	612,681	634,856
Scenario 1 Change (%)	2.8	0.9	-1.2	-2.6	-4.6	-5.9	-7.9
Scenario 2 Change (%)	2.4	-0.1	-2.2	-3.4	-5.5	-6.8	-8.3

TABLE A.5. Impacts of EU enlargement on intra-EU-18 net grain trade

	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Wheat							
EU	(Thousand Metric Tons)						
Baseline	79	128	180	214	233	239	238
Scenario 1	-983	-1,300	-1,623	-1,947	-2,214	-2,435	-2,650
Scenario 2	-842	-1,361	-1,624	-1,920	-2,117	-2,313	-2,483
Czech Republic							
Baseline	-94	-91	-95	-100	-103	-111	-122
Scenario 1	-370	-630	-649	-600	-546	-501	-458
Scenario 2	-129	-152	-162	-115	-74	-39	-1
Hungary							
Baseline	719	727	727	726	728	728	730
Scenario 1	1,175	1,325	1,388	1,455	1,518	1,568	1,608
Scenario 2	940	1,100	1,147	1,223	1,273	1,329	1,358
Poland							
Baseline	-704	-764	-812	-840	-858	-856	-846
Scenario 1	178	604	884	1,092	1,241	1,368	1,500
Scenario 2	32	413	638	811	918	1,023	1,126
Corn							
EU							
Baseline	-862	-850	-827	-808	-780	-751	-708
Scenario 1	-1,835	-2,010	-2,144	-2,145	-2,143	-2,174	-2,172
Scenario 2	-1,334	-1,548	-1,652	-1,709	-1,731	-1,788	-1,781
Czech Republic							
Baseline	-84	-89	-93	-97	-101	-106	-110
Scenario 1	-108	-84	-67	-60	-56	-50	-46
Scenario 2	-85	-40	-21	-13	-9	-5	-1
Hungary							
Baseline	1,202	1,207	1,206	1,210	1,205	1,200	1,184
Scenario 1	1,980	2,197	2,306	2,302	2,297	2,333	2,345
Scenario 2	1,472	1,714	1,800	1,853	1,871	1,932	1,940
Poland							
Baseline	-255	-268	-286	-304	-323	-343	-366
Scenario 1	-38	-102	-95	-97	-99	-109	-127
Scenario 2	-53	-126	-127	-131	-131	-139	-159

TABLE A.5. Continued

	03/04	04/05	05/06	06/07	07/08	08/09	09/10
Barley							
EU							
							(Thousand Metric Tons)
Baseline	150	171	201	221	234	241	248
Scenario 1	30	-135	-237	-266	-248	-223	-190
Scenario 2	-17	-352	-424	-451	-417	-380	-331
Czech Republic							
Baseline	-191	-204	-212	-214	-214	-213	-214
Scenario 1	-325	-528	-551	-541	-534	-523	-513
Scenario 2	-136	-167	-193	-192	-196	-198	-198
Hungary							
Baseline	86	104	117	133	148	166	182
Scenario 1	33	296	405	450	478	496	508
Scenario 2	-72	199	299	353	377	398	407
Poland							
Baseline	-44	-71	-106	-139	-169	-194	-216
Scenario 1	262	368	384	357	305	249	195
Scenario 2	225	320	318	289	236	180	122

TABLE A.6. Impacts of EU enlargement on EU dairy prices

	2003	2004	2005	2006	2007	2008	2009	2010
EU Milk Price								
				(ECU/100 kg)				
Baseline	28	28	27	26	25	25	25	25
Scenario 1 Change (%)	-1.7	-1.2	-1.3	-1.3	-2.0	-4.2	-4.0	-4.0
Scenario 2 Change (%)	-0.8	-0.4	-0.4	-0.3	-0.6	-2.3	-2.6	-3.0
EU Cheese Price								
Baseline	463	462	448	431	424	425	426	428
Scenario 1 Change (%)	-1.9	-1.9	-2.0	-2.1	-2.7	-4.7	-4.6	-4.6
Scenario 2 Change (%)	-0.7	-0.6	-0.6	-0.5	-0.7	-2.4	-2.7	-3.0
EU Butter Price								
Baseline	335	329	314	297	287	287	286	286
Scenario 1 Change (%)	-1.9	-0.1	-0.2	-0.1	-0.1	-2.7	-2.5	-2.5
Scenario 2 Change (%)	-1.5	0.0	-0.2	-0.1	-0.1	-1.1	-1.8	-2.4
EU SMP Price								
Baseline	206	205	197	186	183	183	183	183
Scenario 1 Change (%)	-0.3	0.0	-0.2	-0.4	-1.8	-4.6	-4.2	-4.3
Scenario 2 Change (%)	-0.1	0.0	-0.1	-0.2	-1.0	-4.2	-4.2	-4.3
EU WMP Price								
Baseline	248	246	238	228	223	223	222	222
Scenario 1 Change (%)	-0.7	-0.4	-0.5	-0.5	-1.1	-3.0	-2.8	-2.8
Scenario 2 Change (%)	-0.1	0.1	0.0	0.1	-0.2	-1.8	-2.0	-2.2
Cheese, FOB N. Eur.				(U.S. Dollars/MT)				
Baseline	2,193	2,185	2,172	2,151	2,160	2,179	2,196	2,216
Scenario 1 Change (%)	0.6	-0.3	-0.8	-1.1	-1.3	-1.9	-1.6	-1.4
Scenario 2 Change (%)	1.1	0.1	-0.4	-0.6	-0.7	-1.3	-1.1	-0.9
Butter, FOB N. Eur.								
Baseline	1,545	1,558	1,570	1,550	1,545	1,550	1,561	1,570
Scenario 1 Change (%)	0.0	-0.2	-0.3	-0.4	-0.4	-0.7	-0.4	-0.2
Scenario 2 Change (%)	-0.2	-0.3	-0.4	-0.6	-0.6	-0.6	-0.5	-0.3
SMP, FOB N. Eur.								
Baseline	1,442	1,429	1,423	1,429	1,447	1,476	1,501	1,545
Scenario 1 Change (%)	5.2	4.5	4.4	4.7	4.7	4.0	4.0	3.9
Scenario 2 Change (%)	6.7	5.5	5.6	5.9	6.0	5.1	5.0	5.1
WMP, FOB N. Eur.								
Baseline	1,646	1,646	1,650	1,650	1,662	1,680	1,697	1,721
Scenario 1 Change (%)	1.6	1.2	1.0	1.1	1.0	0.5	0.7	0.7
Scenario 2 Change (%)	2.1	1.4	1.4	1.4	1.4	1.0	1.0	1.1

TABLE A.7. Impacts of EU enlargement on intra-EU-18 dairy product trade

	2003	2004	2005	2006	2007	2008	2009	2010
Butter								
EU	(Thousand MT)							
Baseline	-2.0	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2
Scenario 1	-24.4	-35.4	-40.0	-43.9	-46.7	-44.7	-42.4	-40.6
Scenario 2	-13.9	-23.3	-22.0	-19.3	-15.3	-11.9	-9.3	-7.0
Czech Republic								
Baseline	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Scenario 1	13.8	20.5	23.0	23.8	22.8	21.8	21.3	21.1
Scenario 2	6.0	11.3	13.2	13.7	12.6	11.8	11.5	11.2
Hungary								
Baseline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scenario 1	9.1	13.0	12.2	11.8	11.7	11.5	11.3	11.2
Scenario 2	2.2	4.6	3.3	2.8	2.5	2.4	2.3	2.1
Poland								
Baseline	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Scenario 1	1.5	2.0	4.8	8.2	12.2	11.4	9.8	8.3
Scenario 2	5.7	7.3	5.6	2.8	0.2	-2.2	-4.5	-6.3
Cheese								
EU								
Baseline	-5.4	-5.4	-5.4	-5.4	-5.4	-5.4	-5.4	-5.4
Scenario 1	-106.0	-145.7	-151.7	-156.4	-159.3	-155.2	-149.4	-143.2
Scenario 2	-40.7	-69.4	-65.1	-61.4	-56.3	-50.1	-43.8	-37.4
Czech Republic								
Baseline	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Scenario 1	33.0	44.3	50.4	49.7	48.0	45.7	43.5	41.7
Scenario 2	11.0	19.2	23.9	22.9	21.4	19.4	17.6	15.9
Hungary								
Baseline	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Scenario 1	63.4	90.9	87.5	88.7	89.3	89.0	88.8	88.7
Scenario 2	14.3	32.0	24.4	24.3	24.1	23.7	23.5	23.2
Poland								
Baseline	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Scenario 1	9.6	10.5	13.8	18.0	22.0	20.5	17.1	12.8
Scenario 2	15.4	18.2	16.8	14.2	10.9	7.0	2.7	-1.7

TABLE A.7. Continued

	2003	2004	2005	2006	2007	2008	2009	2010
SMP								
EU	(Thousand MT)							
Baseline	-8.7	-8.7	-8.7	-8.7	-8.7	-8.7	-8.7	-8.7
Scenario 1	-41.8	-51.3	-63.6	-67.8	-84.1	-80.5	-75.9	-70.5
Scenario 2	-42.2	-53.7	-58.7	-52.3	-56.4	-65.7	-65.3	-61.0
Czech Republic								
Baseline	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Scenario 1	3.4	2.9	1.2	0.0	0.0	0.0	0.0	0.0
Scenario 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hungary								
Baseline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scenario 1	4.9	6.8	6.2	5.9	5.7	5.6	5.4	5.2
Scenario 2	1.0	2.1	1.2	0.9	0.7	0.6	0.4	0.3
Poland								
Baseline	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Scenario 1	33.5	41.6	56.2	61.9	78.4	74.9	70.6	65.3
Scenario 2	41.2	51.6	57.5	51.4	55.7	65.1	64.8	60.7

TABLE A.8. Impacts of EU enlargement on EU milk

	2003	2004	2005	2006	2007	2008	2009	2010
Milk Production	(Thousand MT)							
Baseline	121,783	121,774	122,129	122,388	122,690	122,630	122,620	122,569
Scenario 1 Change (%)	-0.05	-0.06	-0.01	0.01	0.00	-0.05	-0.09	-0.11
Scenario 2 Change (%)	-0.03	-0.03	0.02	0.04	0.04	0.00	-0.04	-0.08
Milk Cows	(Thousands)							
Baseline	20,608	20,381	20,227	20,070	19,898	19,671	19,456	19,252
Scenario 1 Change (%)	0.05	-0.03	-0.01	0.00	0.01	0.04	-0.01	0.02
Scenario 2 Change (%)	0.03	-0.03	-0.02	0.00	0.00	0.03	0.01	0.02
Fluid Milk Cons.	(Thousand MT)							
Baseline	31,854	31,839	31,972	32,136	32,147	32,045	31,940	31,819
Scenario 1 Change (%)	0.31	0.21	0.22	0.21	0.30	0.63	0.59	0.59
Scenario 2 Change (%)	0.14	0.06	0.06	0.05	0.09	0.35	0.39	0.43
Industrial Milk Use								
Baseline	90,712	90,786	91,076	91,241	91,596	91,709	91,876	92,013
Scenario 1 Change (%)	-0.18	-0.16	-0.09	-0.07	-0.10	-0.28	-0.32	-0.34
Scenario 2 Change (%)	-0.10	-0.07	0.00	0.04	0.03	-0.09	-0.17	-0.24
Milk Used for Cheese								
Baseline	59,220	59,754	60,654	61,539	62,057	62,416	62,862	63,270
Scenario 1 Change (%)	-0.85	-1.56	-1.52	-1.54	-1.44	-1.02	-1.15	-1.12
Scenario 2 Change (%)	-0.08	-0.54	-0.38	-0.30	-0.16	0.24	0.22	0.28
Milk Used for SMP								
Baseline	13,267	13,127	12,868	12,591	12,500	12,439	12,351	12,274
Scenario 1 Change (%)	1.20	2.55	2.64	2.81	2.59	1.48	1.73	1.67
Scenario 2 Change (%)	-0.07	0.84	0.63	0.54	0.27	-0.74	-0.81	-1.04
Milk Used for WMP								
Baseline	7,897	7,922	7,977	8,051	8,077	8,085	8,095	8,104
Scenario 1 Change (%)	0.78	0.55	0.57	0.61	0.80	1.36	1.33	1.35
Scenario 2 Change (%)	0.69	0.45	0.46	0.48	0.58	1.03	1.12	1.22
Milk Price	(ECU/100 Kg)							
Baseline	28	28	27	26	25	25	25	25
Scenario 1 Change (%)	-1.65	-1.17	-1.28	-1.33	-1.95	-4.19	-4.02	-4.03
Scenario 2 Change (%)	-0.77	-0.36	-0.38	-0.34	-0.58	-2.31	-2.65	-2.97

TABLE A.9. Impacts of EU enlargement on Czech Republic milk

	2003	2004	2005	2006	2007	2008	2009	2010
Milk Production								
				(Thousand MT)				
Baseline	2,814	2,859	2,904	2,951	2,997	3,045	3,096	3,151
Scenario 1 Change (%)	27.76	26.32	28.98	27.29	26.01	24.34	22.59	21.00
Scenario 2 Change (%)	2.86	1.81	4.34	2.95	2.00	0.78	-0.45	-1.72
Milk Cows								
				(Thousands)				
Baseline	600	603	605	607	609	612	615	618
Scenario 1 Change (%)	26.77	24.13	26.86	25.39	24.22	22.68	20.95	19.39
Scenario 2 Change (%)	2.03	0.01	2.58	1.36	0.51	-0.64	-1.82	-3.06
Fluid Milk Cons.								
				(Thousand MT)				
Baseline	327	334	340	347	353	359	364	370
Scenario 1 Change (%)	-7.00	-6.57	-5.35	-4.12	-3.37	-2.72	-2.60	-2.48
Scenario 2 Change (%)	-7.28	-6.81	-5.59	-4.36	-3.68	-3.13	-2.88	-2.69
Industrial Milk Use								
Baseline	2,072	2,111	2,147	2,185	2,223	2,264	2,309	2,356
Scenario 1 Change (%)	39.01	32.92	36.70	33.76	32.10	29.88	27.70	25.77
Scenario 2 Change (%)	5.26	3.69	7.21	4.69	3.47	1.84	0.31	-1.26
Milk Used for Cheese								
Baseline	742	747	749	751	752	753	754	753
Scenario 1 Change (%)	56.14	45.50	51.39	47.77	46.12	43.82	41.60	39.97
Scenario 2 Change (%)	12.56	10.63	15.92	12.66	11.38	9.62	8.02	6.55
Milk Used for SMP								
Baseline	600	611	624	637	650	665	681	700
Scenario 1 Change (%)	33.10	27.28	30.06	26.43	24.47	21.87	19.56	17.28
Scenario 2 Change (%)	0.46	-1.13	1.51	-1.58	-3.05	-4.96	-6.65	-8.50
Domestic Milk Price								
				(Koruny/kg)				
Baseline	7.8	7.8	7.9	7.9	8.0	8.1	8.2	8.3
Scenario 1 Change (%)	28.84	28.96	25.03	20.59	17.78	15.10	15.19	15.19
Scenario 2 Change (%)	29.99	30.02	26.17	21.80	19.43	17.36	16.83	16.47

TABLE A.10. Impacts of EU enlargement on Hungary milk

	2003	2004	2005	2006	2007	2008	2009	2010
Milk Production								
				(Thousand MT)				
Baseline	2,053	2,082	2,104	2,128	2,150	2,175	2,204	2,235
Scenario 1 Change (%)	38.33	47.92	39.21	40.06	40.50	40.20	39.69	39.20
Scenario 2 Change (%)	0.10	10.38	1.39	2.78	3.29	3.48	3.60	3.57
Milk Cows								
				(Thousands)				
Baseline	404	407	408	410	411	413	416	419
Scenario 1 Change (%)	38.33	46.09	38.94	39.81	40.30	40.02	39.53	39.04
Scenario 2 Change (%)	0.10	8.99	1.18	2.58	3.13	3.33	3.46	3.43
Fluid Milk Cons.								
				(Thousand MT)				
Baseline	643	649	655	661	667	673	678	684
Scenario 1 Change (%)	-7.45	-7.01	-6.13	-5.23	-4.63	-4.11	-3.87	-3.64
Scenario 2 Change (%)	-7.59	-7.14	-6.25	-5.36	-4.79	-4.32	-4.01	-3.75
Industrial Milk Use								
Baseline	1,207	1,233	1,251	1,272	1,292	1,315	1,342	1,371
Scenario 1 Change (%)	70.13	76.59	59.52	61.68	61.64	60.45	59.19	58.02
Scenario 2 Change (%)	5.18	21.43	3.86	7.30	7.52	7.42	7.36	7.09
Milk Used for Cheese								
Baseline	615	630	639	649	658	671	686	702
Scenario 1 Change (%)	128.22	141.42	112.24	116.83	116.66	114.26	111.69	109.25
Scenario 2 Change (%)	12.37	43.36	12.98	19.63	19.83	19.42	19.13	18.47
Milk Used for SMP								
Baseline	107	110	112	115	116	118	121	123
Scenario 1 Change (%)	70.84	73.48	53.38	51.38	51.29	48.97	46.50	43.93
Scenario 2 Change (%)	4.62	17.76	-1.63	-1.24	-1.11	-1.96	-3.09	-4.42
Domestic Milk Price								
				(Florint/kg)				
Baseline	45.0	45.8	46.5	47.1	47.9	49.0	50.2	51.5
Scenario 1 Change (%)	84.15	84.48	78.96	72.25	68.22	64.11	63.92	63.64
Scenario 2 Change (%)	85.79	86.00	80.60	73.98	70.58	67.34	66.25	65.45

TABLE A.11. Impacts of EU enlargement on Poland milk

	2003	2004	2005	2006	2007	2008	2009	2010
Milk Production	(Thousand MT)							
Baseline	12,899	13,148	13,489	13,912	14,354	14,803	15,222	15,611
Scenario 1 Change (%)	-6.48	-7.99	-4.36	-1.34	1.08	-2.20	-5.18	-7.64
Scenario 2 Change (%)	-1.14	-2.64	-4.94	-7.56	-10.34	-13.17	-15.68	-17.83
Milk Cows	(Thousands)							
Baseline	3,348	3,375	3,421	3,484	3,548	3,609	3,661	3,704
Scenario 1 Change (%)	-6.48	-10.78	-7.51	-4.50	-2.03	-5.13	-7.92	-10.29
Scenario 2 Change (%)	-1.14	-5.63	-8.10	-10.58	-13.12	-15.78	-18.09	-20.12
Fluid Milk Cons.	(Thousand MT)							
Baseline	5,450	5,510	5,571	5,632	5,694	5,755	5,817	5,879
Scenario 1 Change (%)	-8.69	-8.34	-7.45	-6.56	-5.95	-5.38	-5.14	-4.90
Scenario 2 Change (%)	-8.84	-8.48	-7.59	-6.70	-6.14	-5.63	-5.32	-5.03
Industrial Milk Use								
Baseline	6,746	6,933	7,209	7,563	7,933	8,309	8,656	8,975
Scenario 1 Change (%)	-5.37	-7.34	-0.96	3.54	7.03	0.39	-4.92	-9.20
Scenario 2 Change (%)	4.97	2.53	-2.29	-7.75	-13.08	-18.24	-22.57	-26.19
Milk Used for Cheese								
Baseline	1,637	1,656	1,682	1,721	1,768	1,803	1,834	1,857
Scenario 1 Change (%)	-3.90	-4.93	-0.94	2.29	4.42	2.60	0.68	-0.52
Scenario 2 Change (%)	0.81	-0.04	-0.67	-1.95	-4.07	-5.66	-7.21	-8.24
Milk Used for SMP								
Baseline	1,475	1,522	1,591	1,673	1,752	1,847	1,938	2,031
Scenario 1 Change (%)	-6.66	-8.82	-3.85	-0.54	2.48	-5.00	-10.74	-15.79
Scenario 2 Change (%)	2.96	0.14	-5.96	-12.23	-17.59	-23.37	-28.09	-32.32
Domestic Milk Price	(Zlotys/kg)							
Baseline	0.73	0.74	0.76	0.76	0.78	0.80	0.83	0.85
Scenario 1 Change (%)	95.27	95.42	88.96	82.42	78.04	72.96	72.07	70.84
Scenario 2 Change (%)	97.01	97.03	90.69	84.25	80.54	76.36	74.52	72.74

TABLE A.12. Impacts of EU enlargement on EU livestock and poultry

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Beef Production	(Thousand Metric Tons)									
Baseline	7,672	7,797	7,770	7,737	7,705	7,667	7,629	7,589	7,554	7,521
Scenario 1 Change (%)	0.0	0.0	-0.1	-0.1	0.0	0.0	0.0	-0.1	0.0	0.0
Scenario 2 Change (%)	0.0	0.0	-0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.2
Beef Consumption										
Baseline	7,343	7,398	7,368	7,336	7,309	7,275	7,239	7,199	7,162	7,124
Scenario 1 Change (%)	0.0	0.0	0.5	0.3	0.0	-0.1	0.0	0.3	0.3	0.1
Scenario 2 Change (%)	0.0	0.0	0.4	0.2	-0.1	-0.3	-0.4	-0.5	-0.7	-0.9
Pork Production										
Baseline	17,953	18,030	18,107	18,183	18,251	18,294	18,320	18,388	18,451	18,518
Scenario 1 Change (%)	0.0	0.0	0.1	0.3	0.5	0.7	0.8	0.9	0.9	0.9
Scenario 2 Change (%)	0.0	0.0	0.1	0.3	0.5	0.7	0.8	0.9	0.9	1.0
Pork Consumption										
Baseline	16,866	16,921	16,993	17,048	17,078	17,122	17,175	17,185	17,193	17,226
Scenario 1 Change (%)	0.0	0.0	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0
Scenario 2 Change (%)	0.0	0.0	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0
Broiler Production										
Baseline	6,147	6,207	6,256	6,316	6,379	6,445	6,510	6,581	6,650	6,731
Scenario 1 Change (%)	0.0	0.0	0.4	1.0	1.3	1.5	1.5	1.4	1.3	1.3
Scenario 2 Change (%)	0.0	0.0	0.4	1.0	1.3	1.5	1.5	1.5	1.4	1.4
Broiler Consumption										
Baseline	5,607	5,661	5,708	5,765	5,823	5,883	5,942	6,009	6,073	6,148
Scenario 1 Change (%)	0.0	0.0	-0.1	0.0	0.2	0.3	0.3	0.3	0.3	0.3
Scenario 2 Change (%)	0.0	0.0	-0.1	0.0	0.2	0.3	0.4	0.4	0.4	0.5
Beef Producer Price †										
Baseline	228	213	210	208	206	204	203	203	203	202
Scenario 1 Change (%)	0.0	0.0	-1.9	-1.4	0.0	0.0	-0.5	-1.5	-1.5	-1.0
Scenario 2 Change (%)	0.0	0.0	-1.0	-0.5	0.0	1.0	1.5	2.0	3.0	3.5
Pork Producer Price †	(ECU per 100 Kilograms)									
Baseline	115	115	115	117	118	120	121	123	126	126
Scenario 1 Change (%)	0.0	0.0	0.9	0.0	0.8	0.0	0.0	0.0	-0.8	0.0
Scenario 2 Change (%)	0.0	0.0	0.9	0.0	0.8	0.0	0.0	0.8	0.0	0.8
Poultry Producer Price †										
Baseline	105	106	108	110	112	114	116	118	120	121
Scenario 1 Change (%)	0.0	0.0	0.0	0.0	-0.9	-0.9	-1.7	-1.7	-1.7	-1.7
Scenario 2 Change (%)	0.0	0.0	0.0	0.0	-0.9	-0.9	-0.9	-0.8	-0.8	-0.8

† Producer prices are projections of the MLC reference price

TABLE A.13. Impacts of EU enlargement on Czech Republic livestock and poultry

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pork Production	(Thousand Metric Tons)									
Baseline	666	664	664	663	664	663	662	662	661	662
Scenario 1 Change (%)	0.0	0.0	-6.6	-3.2	-4.5	-4.4	-3.2	-1.4	0.8	3.0
Scenario 2 Change (%)	0.0	0.0	-6.6	-3.0	-4.4	-4.2	-3.0	-1.1	1.2	3.3
Pork Consumption										
Baseline	679	677	677	678	677	677	676	675	674	674
Scenario 1 Change (%)	0.0	0.0	2.5	2.1	2.1	1.8	1.8	1.6	1.6	1.3
Scenario 2 Change (%)	0.0	0.0	2.5	2.1	2.1	1.8	1.8	1.6	1.6	1.3
Broiler Production										
Baseline	187	188	190	191	194	196	198	200	203	206
Scenario 1 Change (%)	0.0	0.0	-3.2	19.9	22.7	23.0	22.7	23.0	22.2	22.3
Scenario 2 Change (%)	0.0	0.0	-3.2	20.4	23.2	23.5	23.7	24.0	23.2	22.8
Broiler Consumption										
Baseline	194	197	200	202	205	208	211	215	218	222
Scenario 1 Change (%)	0.0	0.0	-1.5	-0.5	0.0	0.5	1.4	1.4	1.8	2.3
Scenario 2 Change (%)	0.0	0.0	-1.5	-0.5	0.0	0.5	1.4	1.4	2.3	2.7
Beef Production										
Baseline	235	229	224	221	219	218	217	218	219	220
Scenario 1 Change (%)	0.0	0.0	-2.2	7.2	11.9	15.1	17.5	17.4	16.9	16.4
Scenario 2 Change (%)	0.0	0.0	-2.2	-0.9	-1.4	-0.5	-0.5	-0.9	-1.4	-2.3
Beef Consumption										
Baseline	242	240	239	238	238	239	240	241	241	241
Scenario 1 Change (%)	0.0	0.0	4.6	5.0	5.5	5.4	5.4	5.4	5.8	6.2
Scenario 2 Change (%)	0.0	0.0	4.2	5.0	5.5	5.4	5.4	5.0	5.4	5.4
Pork Producer Price	(Koruny per 100 Kilograms)									
Baseline	5,962	6,286	6,319	6,230	6,283	6,394	6,521	6,644	6,748	6,758
Scenario 1 Change (%)	0.0	0.0	-31.0	-28.6	-27.2	-26.9	-27.0	-26.1	-25.0	-23.7
Scenario 2 Change (%)	0.0	0.0	-31.0	-28.5	-27.2	-26.8	-26.8	-25.8	-24.6	-23.3
Poultry Producer Price										
Baseline	4,030	4,341	4,607	4,842	5,077	5,320	5,577	5,841	6,115	6,318
Scenario 1 Change (%)	0.0	0.0	-11.8	-13.8	-15.7	-17.4	-19.1	-20.5	-21.8	-22.9
Scenario 2 Change (%)	0.0	0.0	-11.7	-13.7	-15.6	-17.3	-18.8	-20.2	-21.5	-22.5
Beef Producer Price										
Baseline	9,516	10,542	11,281	11,770	12,025	12,173	12,294	12,507	12,784	13,077
Scenario 1 Change (%)	0.0	0.0	-31.2	-33.6	-34.1	-34.6	-35.1	-36.1	-36.8	-37.4
Scenario 2 Change (%)	0.0	0.0	-30.8	-33.2	-33.9	-34.1	-33.9	-33.9	-34.1	-34.7

TABLE A.14. Impacts of EU enlargement on Hungary livestock and poultry

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pork Production										
	(Thousand Metric Tons)									
Baseline	493	493	495	496	498	499	500	503	505	507
Scenario 1 Change (%)	0.0	0.0	-2.0	-7.3	-10.0	-13.2	-16.0	-18.1	-19.4	-20.1
Scenario 2 Change (%)	0.0	0.0	-2.0	-7.5	-10.0	-13.4	-16.2	-18.3	-19.6	-20.3
Pork Consumption										
Baseline	434	437	439	442	444	446	448	450	453	455
Scenario 1 Change (%)	0.0	0.0	1.1	1.1	1.1	1.1	1.3	1.3	1.1	1.1
Scenario 2 Change (%)	0.0	0.0	1.1	1.1	1.1	1.1	1.3	1.3	1.1	1.1
Broiler Production										
Baseline	234	234	235	236	237	238	240	241	243	246
Scenario 1 Change (%)	0.0	0.0	12.8	-5.9	-6.8	-6.3	-6.3	-6.2	-6.6	-6.9
Scenario 2 Change (%)	0.0	0.0	12.8	-5.9	-7.2	-6.7	-6.7	-6.6	-7.0	-7.3
Broiler Consumption										
Baseline	185	189	192	195	198	201	204	207	210	214
Scenario 1 Change (%)	0.0	0.0	-2.6	-2.6	-2.5	-2.5	-2.5	-2.4	-2.4	-2.8
Scenario 2 Change (%)	0.0	0.0	-2.1	-2.6	-2.5	-2.5	-2.5	-2.4	-2.4	-2.8
Beef Production										
Baseline	68	70	70	71	71	71	71	72	73	73
Scenario 1 Change (%)	0.0	0.0	12.9	21.1	33.8	39.4	43.7	44.4	45.2	46.6
Scenario 2 Change (%)	0.0	0.0	12.9	8.5	11.3	9.9	11.3	9.7	9.6	9.6
Beef Consumption										
Baseline	64	65	66	68	70	72	74	75	76	78
Scenario 1 Change (%)	0.0	0.0	-10.6	-11.8	-11.4	-11.1	-12.2	-10.7	-9.2	-9.0
Scenario 2 Change (%)	0.0	0.0	-10.6	-11.8	-11.4	-11.1	-12.2	-10.7	-10.5	-10.3
Pork Producer Price										
	(Forint per 100 Kilograms)									
Baseline	30,478	31,944	33,391	34,750	36,115	37,527	38,986	40,580	42,244	43,438
Scenario 1 Change (%)	0.0	0.0	5.3	4.1	4.0	3.1	2.0	2.0	1.9	1.8
Scenario 2 Change (%)	0.0	0.0	5.3	4.3	4.0	3.3	2.3	2.4	2.4	2.4
Poultry Producer Price										
Baseline	23,019	24,134	25,230	26,201	27,159	28,222	29,381	30,582	31,855	32,779
Scenario 1 Change (%)	0.0	0.0	29.9	29.6	29.4	28.9	28.4	28.0	27.6	27.5
Scenario 2 Change (%)	0.0	0.0	30.0	29.8	29.5	29.1	28.8	28.5	28.3	28.2
Beef Producer Price										
Baseline	32,468	34,608	36,543	37,511	38,045	38,725	39,742	41,582	43,948	46,616
Scenario 1 Change (%)	0.0	0.0	71.3	69.6	71.0	70.2	67.8	62.0	56.5	50.6
Scenario 2 Change (%)	0.0	0.0	72.3	70.7	71.4	71.7	70.9	67.7	63.0	57.2

TABLE A.15. Impacts of EU enlargement on Poland livestock and poultry

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pork Production	(Thousand Metric Tons)									
Baseline	1,743	1,767	1,784	1,799	1,816	1,834	1,852	1,870	1,887	1,905
Scenario 1 Change (%)	0.0	0.0	0.7	0.0	-0.3	-0.9	-1.8	-2.5	-3.1	-3.7
Scenario 2 Change (%)	0.0	0.0	0.7	0.1	-0.2	-0.9	-1.6	-2.2	-2.9	-3.5
Pork Consumption										
Baseline	1,621	1,643	1,661	1,677	1,694	1,711	1,729	1,745	1,760	1,777
Scenario 1 Change (%)	0.0	0.0	-0.5	-0.3	-0.2	-0.2	-0.1	-0.1	0.0	0.1
Scenario 2 Change (%)	0.0	0.0	-0.5	-0.2	-0.2	-0.2	-0.1	-0.1	0.1	0.1
Broiler Production										
Baseline	314	323	334	346	358	370	382	393	404	418
Scenario 1 Change (%)	0.0	0.0	-19.2	-28.6	-32.1	-33.0	-32.7	-31.8	-30.4	-28.9
Scenario 2 Change (%)	0.0	0.0	-18.9	-28.3	-31.6	-32.4	-32.2	-31.0	-29.7	-28.2
Broiler Consumption										
Baseline	335	347	360	374	387	400	413	425	437	451
Scenario 1 Change (%)	0.0	0.0	6.1	4.8	3.9	3.0	2.2	1.6	1.4	0.9
Scenario 2 Change (%)	0.0	0.0	6.1	4.8	3.9	3.0	2.2	1.9	1.6	1.1
Beef Production										
Baseline	380	380	379	379	381	385	393	403	414	425
Scenario 1 Change (%)	0.0	0.0	10.6	0.5	-12.3	-14.0	-11.7	-4.0	-3.9	-6.4
Scenario 2 Change (%)	0.0	0.0	5.8	3.4	-2.4	-6.0	-8.9	-11.7	-14.7	-17.9
Beef Consumption										
Baseline	352	357	361	366	371	378	387	397	408	419
Scenario 1 Change (%)	0.0	0.0	-5.0	-3.0	-1.3	0.3	1.0	2.0	2.5	2.9
Scenario 2 Change (%)	0.0	0.0	-5.0	-3.0	-1.3	0.0	0.8	1.3	1.7	1.9
Pork Producer Price	(Zlotys per 100 Kilograms)									
Baseline	5,198	5,408	5,751	6,124	6,472	6,791	7,095	7,417	7,760	8,053
Scenario 1 Change (%)	0.0	0.0	4.8	1.4	-0.3	-2.0	-3.5	-3.9	-4.3	-5.2
Scenario 2 Change (%)	0.0	0.0	4.9	1.6	-0.3	-1.9	-3.2	-3.4	-3.8	-4.6
Poultry Producer Price										
Baseline	5,845	6,127	6,382	6,597	6,795	7,009	7,235	7,461	7,698	7,857
Scenario 1 Change (%)	0.0	0.0	-12.0	-11.7	-11.1	-10.8	-10.3	-9.6	-8.9	-8.2
Scenario 2 Change (%)	0.0	0.0	-11.9	-11.5	-11.1	-10.6	-10.0	-9.2	-8.5	-7.7
Beef Producer Price										
Baseline	6,726	7,666	8,731	9,846	10,891	11,835	12,556	13,156	13,690	14,227
Scenario 1 Change (%)	0.0	0.0	22.9	10.9	2.6	-4.2	-8.6	-11.8	-13.4	-14.8
Scenario 2 Change (%)	0.0	0.0	23.7	11.6	2.9	-3.4	-6.9	-8.7	-9.7	-11.1

TABLE A.16. Impacts of EU enlargement on intra-EU-18 trade

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Beef										
EU	(Thousand Metric Tons)									
Baseline	-9	-3	3	8	13	17	20	21	22	21
Scenario 1	-9	-3	-52	-25	18	25	18	-9	-6	9
Scenario 2	-9	-3	-36	-9	24	47	65	81	99	119
Czech Republic										
Baseline	-8	-11	-13	-15	-17	-18	-19	-19	-19	-18
Scenario 1	-8	-11	-37	-20	-12	-6	-3	-3	-4	-6
Scenario 2	-8	-11	-36	-37	-40	-40	-41	-42	-43	-44
Hungary										
Baseline	7	6	4	3	1	-1	-2	-3	-4	-4
Scenario 1	7	6	21	26	33	35	36	37	37	36
Scenario 2	7	6	21	17	17	15	14	13	11	10
Poland										
Baseline	10	8	7	5	3	2	1	1	1	1
Scenario 1	10	8	68	19	-39	-54	-50	-25	-27	-40
Scenario 2	10	8	51	30	-1	-22	-38	-52	-68	-85
Pork										
EU										
Baseline	34	37	34	29	21	30	39	29	18	15
Scenario 1	34	37	89	104	125	164	198	198	192	192
Scenario 2	34	37	89	103	124	162	195	194	188	188
Czech Republic										
Baseline	-15	-14	-14	-16	-16	-16	-16	-15	-15	-15
Scenario 1	-15	-14	-80	-57	-64	-62	-54	-41	-26	-9
Scenario 2	-15	-14	-80	-57	-63	-61	-53	-39	-23	-6
Hungary										
Baseline	3	1	2	5	8	4	1	5	9	10
Scenario 1	3	1	-10	-35	-46	-67	-85	-92	-95	-98
Scenario 2	3	1	-10	-36	-47	-68	-86	-93	-96	-99
Poland										
Baseline	-21	-24	-22	-18	-13	-19	-24	-19	-12	-10
Scenario 1	-21	-24	1	-12	-15	-35	-58	-65	-72	-85
Scenario 2	-21	-24	1	-11	-13	-33	-56	-63	-69	-82

TABLE A.16. Continued

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Poultry										
EU	(Thousand Metric Tons)									
Baseline	-14	-9	-5	-2	1	3	5	7	9	10
Scenario 1	-14	-9	25	59	71	77	78	78	77	74
Scenario 2	-14	-9	25	57	69	75	76	76	75	72
Czech Republic										
Baseline	-7	-8	-10	-11	-12	-13	-13	-14	-15	-16
Scenario 1	-7	-8	-13	28	32	31	30	28	26	24
Scenario 2	-7	-8	-13	29	34	33	31	30	27	26
Hungary										
Baseline	28	26	25	23	22	22	21	20	19	18
Scenario 1	28	26	67	22	18	17	16	15	13	13
Scenario 2	28	26	66	21	17	16	15	14	12	12
Poland										
Baseline	-8	-9	-10	-11	-11	-12	-12	-12	-13	-13
Scenario 1	-8	-9	-78	-109	-121	-125	-124	-121	-117	-111
Scenario 2	-8	-9	-78	-108	-120	-123	-122	-119	-115	-109