

**FAPRI analysis of CAP reform  
in the  
Agenda 2000 final decisions**

**By the Food and Agricultural Policy Research Institute (FAPRI)**

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## Executive summary

The Food and Agricultural Policy Research Institute (FAPRI) conducted two separate analyses of the final decisions on CAP reform in the Agenda 2000 using its models of EU and world agriculture. The FAPRI unit at Iowa State University examined the reforms as part of a project to examine the implications of EU expansion. The FAPRI unit at the University of Missouri looked at the reforms as part of an ongoing project in Ireland and Northern Ireland.

FAPRI maintains a system of linked non-spatial partial equilibrium models of major world agricultural markets. For cereals, oilseeds, meat, and dairy products, FAPRI models estimate production, consumption, stocks, prices, and trade in major trading countries. The FAPRI-Iowa State analysis was conducted with the standard set of models FAPRI uses each year to develop baseline projections of world agricultural markets and to conduct policy analysis. The FAPRI-Missouri analysis utilized an experimental version of the EU model that provides country level detail for France, Germany, Italy, and the United Kingdom.

Although the two analyses were done with different models using different conditioning assumptions, most of the estimated impacts of the CAP reforms were similar. Compared to a no-reform baseline, both analyses estimate that the reforms would result in:

- lower EU domestic prices for cereals, meat, and dairy products,
- market price reductions for cereals and beef that are less than the reductions in support prices,
- increased production and exports of wheat with a potential for unsubsidised exports,
- reduced EU oilseed production, but only small effects on world oilseed markets,
- reduced EU production and stocks of beef, and
- small dairy sector effects until support prices are reduced in 2005.

Many of the differences in results between the two analyses can be explained by differences in conditioning assumptions. For example, the FAPRI-Iowa State analysis uses the macroeconomic assumptions underlying the January 1999 FAPRI baseline, including a significant strengthening of the euro relative to the dollar. This results in lower levels of EU cereal exports than in the FAPRI-Missouri analysis, which assumes the dollar-euro exchange rate remains steady at levels prevailing in early 1999.

Full reports on the two analyses can be found in the “Publications” section of the web sites maintained by the two FAPRI units ([www.fapri.iastate.edu](http://www.fapri.iastate.edu) for the Iowa State paper, and [www.fapri.missouri.edu](http://www.fapri.missouri.edu) for the University of Missouri paper).

## 1. Introduction

The Food and Agricultural Policy Research Institute (FAPRI)<sup>26</sup> conducted two separate analyses of the Agenda 2000 reforms of the Common Agricultural Policy (CAP) shortly after final decisions were reached in Berlin in March 1999. The FAPRI-Missouri unit was asked to look at the reforms as part of an ongoing project with the Agricultural and Food Development Authority (Teagasc) in Ireland and Queens University in Northern Ireland (Westhoff and Young 1999). FAPRI-Iowa State examined the reforms as part of a project funded by the Midwest Agribusiness Trade Research Information Center to evaluate the likely impacts of EU expansion (FAPRI-ISU 1999).

The two analyses were conducted relative to a common baseline for world agricultural markets that was prepared in January 1999. However, the two analyses used different models for EU agriculture and different macroeconomic assumptions, especially with regard to exchange rates. Results of the two analyses are broadly similar, with differences that can be explained by the use of alternative models and variations in several assumptions.

## 2. FAPRI models

FAPRI has developed an integrated set of non-spatial partial equilibrium models for major agricultural markets. Current FAPRI models cover world markets for cereals, oilseeds, meats, dairy products, cotton, and sugar. For each commodity, the largest exporting and importing countries are treated separately, with other countries included in regional groupings or a “rest of world” aggregate. In the case of wheat, for example, the 1999 version of the model includes 7 exporting countries, 13 importing countries, 8 regional groupings, and a small rest-of-world category. For most countries and commodities, the model estimates production, consumption, and trade; in many cases the model also estimates domestic market prices, stocks, and other variables of interest.

Where feasible and appropriate, parameters of the FAPRI model were estimated using econometric techniques applied to time series data. In some cases, however, data limitations, recent structural change, or resource limitations mean that econometric techniques cannot be used to determine model parameters. In these cases, the model uses assumed parameters that are taken from the literature or that are established based on analyst judgement and input from market specialists.

The model estimates both the area devoted to a particular crop and the yield per harvested hectare. Area is generally a function of output and input prices and government policies. Yield equations incorporate technical progress and price responses. For beef and pork, supply equations consider herd dynamics, where the key behavioural equations generally are those that determine breeding herd inventory, slaughter, and carcass weights. These meat supply equations are functions of livestock prices, feed and other input prices, and

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<sup>26</sup> FAPRI is a joint institute of Iowa State University and the University of Missouri, created to provide objective, quantitative analysis of issues related to world agriculture. FAPRI collaborates with a number of other universities, government agencies, and other institutions in the United States, the European Union, and around the world. For each of the past 15 years, FAPRI has developed ten-year projections of world agricultural markets. FAPRI analysts use a system of linked models and the judgement of commodity and country specialists to estimate the supply, demand, and prices of major commodities under alternative sets of assumptions.

government policies. The dairy model estimates both cow numbers and milk yield per cow, and the supply equations are functions of milk prices, feed and other input prices, and government policies. In all supply equations, care is taken to ensure that the model reflects marginal incentives. As a result, a direct production subsidy will have a larger effect on production, all else equal, than a more decoupled subsidy that provides the same level of producer income support. Because the models attempt to incorporate biological constraints and other dynamic factors, they are intended to reflect both short-run and long-run supply behaviour.

Per capita consumer demand equations for cereals, oils, meats, dairy products, and sugar are a function of the price of the food in question, the prices of other foods, and income. Feed demand for cereals and oilseed meals depend on livestock production and feed prices. Oilseed crush demand is a function of relative oilseed and oilseed product prices. Allocation of milk to production of the various dairy products is a function of relative prices. End-of-period stocks generally are a function of prices and government policies.

The models close different markets in different ways, depending on the nature of the product and policies. In the simplest case of a relatively homogeneous good without insulating policies, domestic prices in each country are directly linked to a world market price. Net trade for each country is simply the difference between domestic supply and demand at this price effectively determined in world markets. The world market price is that which causes total world exports to equal total world imports, thus balancing global supply and demand.

For more heterogeneous goods (e.g., meats), trade is a function of relative prices and other variables, and domestic market prices are determined by equating total supply (production, changes in stocks, and imports) and demand in domestic markets. Where tariffs, quotas, support prices, and other government policies determine or influence market prices, the models attempt to incorporate these effects.

The EU component of the basic FAPRI model treats the European Union as a bloc. The EU portions of the model generally follow the structure described above, with a number of special features to reflect idiosyncrasies of EU policies and markets. Intervention prices place an effective floor below market prices. Milk supplies are largely determined by milk quotas. Set-asides, direct payments, and other policies affect crop and livestock supplies. Exports are limited by WTO restrictions on subsidised exports whenever EU domestic prices exceed prices prevailing in world markets. This basic FAPRI model is used to develop the annual FAPRI baseline projections for EU and world markets, and was used by FAPRI-Iowa State in conducting its analysis of the Agenda 2000 reforms.

As part of its project in Ireland, FAPRI-Missouri is developing an experimental new model of the EU agricultural sector. The model again follows the general structure outlined above, but it provides country-level detail for France, Germany, Italy, and the United Kingdom, while treating the other countries of the European Union as a group. Market prices in the various member countries are linked, but domestic supply and demand conditions affect cross-country price relationships. Net export supply for the European Union is the sum of the net export supplies (production plus beginning stocks minus domestic consumption minus ending stocks) of the member countries at a given set of prices. Net export demand for the European Union is a behavioural function of EU and world prices that also attempts to incorporate WTO limitations and plausible behaviour by the European Commission in establishing export refunds and other

measures affecting EU trade and prices. Domestic EU market prices are those that equate EU net export supply and demand.

The experimental FAPRI-Missouri model provides additional detail in the beef and dairy sectors, reflecting the priorities of FAPRI's Irish collaborators. For example, suckler cow inventories are affected by quota levels and by direct payments for both suckler cows and other cattle. Furthermore, the equations assign different weights to different factors depending on the relationship between actual suckler cow numbers and quota levels. Marginal incentives will be different for a producer who maintains fewer cows than the payment quota than for a producer who holds more cows than are eligible for payments. The dairy model tracks the supply and demand for both protein and fat, making it possible to examine the implication of changes in the composition of milk and dairy products.

The new model can be operated as a component of the overall FAPRI modelling system. Alternatively, it can be operated in a stand-alone fashion by introducing reduced-form equations that determine world market prices as a function of EU trade levels. These world price equations are calibrated to mimic the dynamic behaviour of a global model and are aligned with the most recent FAPRI world baseline. This experimental FAPRI-Missouri model is still undergoing testing and modification, but it is fully operational and was used to conduct FAPRI-Missouri's analysis of the Agenda 2000 reforms.

### **3. Scenario assumptions**

The FAPRI-Iowa State (FAPRI-ISU 1999) and the FAPRI-Missouri (Westhoff and Young 1999) analyses each examine two scenarios. The baseline scenario assumes a continuation of policies that were in place prior to March 1999, while the Agenda 2000 reform scenario incorporates provisions of the March 1999 agreement.

Most of the specific assumptions underlying the two analyses are identical (cf. table 3.1). In the baseline, intervention prices, milk quotas, and most other policy variables are continued indefinitely at their 1999 levels. In the Agenda 2000 scenario, annual levels for each of these policy variables are set as prescribed by the March 1999 agreement. In years after 2005 for crops and beef and 2007 for dairy, policy variables are frozen at the final levels specified under the Agenda 2000 agreement.

Both analyses begin with the January 1999 FAPRI baseline as the benchmark for world agricultural market conditions (FAPRI 1999). In general, the FAPRI baseline indicated a gradual recovery in the prices of most major agricultural products traded in world markets. Prices for most products remain below the levels prevailing in the mid-1990s, however. In the analyses, world market prices differ from their January 1999 FAPRI baseline levels whenever EU trade differs from the levels indicated in that baseline.

Both analyses also assume similar behaviour by the EU Commission in managing the CAP. It is generally assumed that the Commission will act in ways to avoid stock accumulation when possible. While WTO limits place a cap on subsidised exports, estimated export levels reflect a balancing of an assumed desire to support market prices and avoid stock accumulation by disposing of exportable supplies with an assumed desire to limit the budgetary costs of export refunds. As a result of this balancing assumption, the analyses indicate that subsidised exports often fall short of the WTO maximum levels, and that market prices often fail to change by the same proportion as changes in

intervention prices.

**Table 3.1 Common assumptions of the FAPRI-Iowa State and FAPRI-Missouri analyses**

|                                      | Baseline      | Agenda 2000 Reform |
|--------------------------------------|---------------|--------------------|
| <b>Cereal and oilseed policy</b>     |               |                    |
| Cereal intervention price, 2001-09   | 119 €/t       | 101 €/t            |
| Cereal compensation, 2001-09         | 54 €/t        | 63 €/t             |
| Oilseed compensation, 2002-09        | 94 €/t        | 63 €/t             |
| Mandatory set-aside rate, 2000-01    | 10%           | 10%                |
| Wheat export subsidy limit, 2001-09  | 14.4 mio t    | 14.4 mio t         |
| <b>Beef policy</b>                   |               |                    |
| Beef market support, 2002-09         | 278 €/100 kg  | 222 €/100 kg       |
| Suckler cow payment quota, 2000-09   | 11.4 mio head | 10.8 mio head      |
| Suckler cow premium, 2002-09         | 145 €/head    | 200 €/head         |
| Male bovine premium, 2002-09         | 135 €/head    | 210 €/head         |
| <b>Dairy policy</b>                  |               |                    |
| Milk quota, 2007-09                  | 117 mio t     | 120 mio t          |
| Butter intervention price, 2007-09   | 328 €/100 kg  | 279 €/100 kg       |
| Skim milk powder int. price, 2007-09 | 206 €/100 kg  | 175 €/100 kg       |
| <b>Macroeconomic variables</b>       |               |                    |
| GDP growth rate, 2000-09 avg.        | 2.5%/year     | 2.5%/year          |
| GDP deflator inflation, 2000-09 avg. | 2.3%/year     | 2.3%/year          |

In both the baseline and the Agenda 2000 scenario, WTO restrictions on export subsidies and market access requirements are continued indefinitely at 2000/01 levels. Based on projections by macroeconomic forecasters at Standard and Poor's DRI, rates of growth in real GDP in the European Union over the next ten years average 2.5 % per year. Inflation as measured by the GDP deflator averages 2.3 % per year.

Exchange rates are a critical difference in assumptions between the FAPRI-Iowa State study and the FAPRI-Missouri study (cf. table 3.2). The FAPRI-Iowa State study uses DRI projections that called for a significant appreciation of the euro vs. the dollar. The 2001-2009 average exchange rate is \$1.25 per euro, with a significant strengthening of the euro over time. The FAPRI-Missouri study, in contrast, assumes that the dollar-euro exchange rate continues indefinitely at \$1.08 per euro, the June 1999 futures rate prevailing on April 1, 1999.

This difference in exchange rate assumptions is the principal reason the two analyses differ in a key policy assumption, the applied rate of mandatory set aside. In the FAPRI-Iowa State analysis, EU baseline wheat prices are too high to allow unsubsidised exports before 2006. To keep stocks from building, the mandatory set-aside rate is increased from 10 % in 2000 and 2001 to 12 % from 2002-2004 and 15 % from 2005-2008. In the Agenda 2000 scenario, EU prices fall sufficiently to allow unsubsidised exports, and the mandatory set-aside rate can be maintained at 10 % indefinitely.

In the FAPRI-Missouri analysis, the weaker euro makes EU wheat more competitive in world markets, eventually allowing unsubsidised exports even in the baseline. As a result, baseline set-aside rates are maintained at 10 % through 2005, and then are reduced to

5 %. In the Agenda 2000 scenario, unsubsidised wheat exports become possible almost immediately, and set-aside rates are reduced to 5 % in 2002 and 0 % in 2006.

**Table 3.2 Differing assumptions of the FAPRI-Iowa State and FAPRI-Missouri analyses**

|   | Baseline | Agenda 2000 Reform |
|---|----------|--------------------|
| <b>Exchange rate, 2000-09 average</b>     |          |                    |
| FAPRI-Iowa State                          | \$1.25/€ | \$1.25/€           |
| FAPRI-Missouri                            | \$1.08/€ | \$1.08/€           |
| <b>Cereal mandatory set-aside rate</b>    |          |                    |
| FAPRI-Iowa State, 2002-04                 | 12%      | 10%                |
| FAPRI-Iowa State, 2005-08                 | 15%      | 10%                |
| FAPRI-Missouri, 2002-05                   | 10%      | 5%                 |
| FAPRI-Missouri, 2006-09                   | 5%       | 0%                 |
| <b>Beef unsubsidised export potential</b> |          |                    |
| FAPRI-Iowa State                          | Limited  | Significant        |
| FAPRI-Missouri                            | Limited  | Limited            |

A final significant difference in assumptions between the two scenarios concerns the potential for unsubsidised beef exports. The FAPRI-Iowa State analysis assumes that unsubsidised EU beef exports become possible whenever the EU domestic beef market price is 5 % below the U.S. equivalent. In the Agenda 2000 analysis, this makes it possible for the European Union to export beef without subsidy, and results in EU domestic beef market prices that tend to move with prices in U.S. markets. The FAPRI-Missouri analysis assumes less potential for unsubsidised EU beef exports, primarily because it considers EU beef a poor substitute for beef traded in Pacific basin markets.

#### 4. Model results

The two FAPRI studies generally yield similar qualitative and even quantitative results. Most of the major differences can be explained by the differences in assumptions outlined above, although there are also some minor differences that can be attributed to differences in model structure and parameters.

##### 4.1 Cereal and oilseed sector results

The reduction in cereal intervention prices significantly increases the probability that the European Union will be able to export wheat without the use of export subsidies. In both FAPRI studies, the ability to export wheat without subsidy increases total demand to the point that a reduction in set-aside rates is possible without resulting in a build-up in stocks. Because of the assumed reduction in set-aside rates, cereal area and production expand in spite of lower cereal market prices. While part of the expansion in production is consumed domestically, much of it is exported. Stocks of wheat are reduced dramatically, as EU wheat market prices are supported by world markets rather than by intervention (cf. table 3.3).

In both studies, the increase in harvested cereal area is less than the reduction in compulsory set aside. In the FAPRI-Missouri analysis, for example, reducing the compulsory set-aside rate in 2005 from 10 % in the baseline to 5 % in the Agenda 2000 scenario increases total cereal and oilseed harvested area by just 2.2 %. Two principal

reasons account for the modest response of harvested area to the assumed reduction in compulsory set aside. First, small farmers are exempt from compulsory set-aside, so changes in the set-aside rate have no direct effect on their planting decisions. Second, reduced cereal prices encourage more farmers to participate in voluntary set-aside. Farmers with marginal production costs that exceed these lower market prices would rationally choose to place land in the voluntary set-aside program if that alternative is open to them. Expanded area and reduced prices result in a modest reduction in average yields per harvested hectare, but not enough to offset fully the increase in area. Oilseed area and production decline in response to the sharp reduction in direct payments for oilseed production.

**Table 3.3 Cereal and oilseed sector results**

|                                    | Baseline<br>2002 | Agenda 2000<br>2002 | Change | Baseline<br>2005 | Agenda 2000<br>2005 | Change |
|------------------------------------|------------------|---------------------|--------|------------------|---------------------|--------|
| <b>Wheat area (mio ha)</b>         |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 16.3             | 16.7                | 2.6%   | 15.8             | 16.8                | 5.9%   |
| FAPRI-Missouri                     | 16.8             | 17.3                | 3.2%   | 16.8             | 17.5                | 4.0%   |
| <b>Wheat yield (t/ha)</b>          |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 5.96             | 5.88                | -1.4%  | 6.19             | 6.12                | -1.2%  |
| FAPRI-Missouri                     | 6.06             | 6.03                | -0.5%  | 6.29             | 6.25                | -0.7%  |
| <b>Wheat production (mio t)</b>    |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 97.1             | 98.3                | 1.2%   | 97.9             | 102.5               | 4.7%   |
| FAPRI-Missouri                     | 101.6            | 104.3               | 2.6%   | 105.8            | 109.3               | 3.3%   |
| <b>Wheat domestic use (mio t)</b>  |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 83.5             | 83.6                | 0.1%   | 84.5             | 84.6                | 0.0%   |
| FAPRI-Missouri                     | 87.4             | 87.8                | 0.5%   | 88.4             | 88.5                | 0.1%   |
| <b>Wheat net exports (mio t)</b>   |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 13.3             | 15.1                | 13.2%  | 13.3             | 18.0                | 35.5%  |
| FAPRI-Missouri                     | 14.1             | 17.8                | 26.4%  | 18.3             | 21.0                | 14.9%  |
| <b>Wheat ending stocks (mio t)</b> |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 16.1             | 13.4                | -17.3% | 19.7             | 12.8                | -35.2% |
| FAPRI-Missouri                     | 17.7             | 11.2                | -36.6% | 15.7             | 9.9                 | -36.9% |
| <b>Wheat market price (€/t)</b>    |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 123.0            | 109.8               | -10.7% | 124.5            | 114.0               | -8.4%  |
| FAPRI-Missouri                     | 128.9            | 120.4               | -6.6%  | 131.1            | 125.6               | -4.2%  |
| <b>World wheat price (US\$/t)</b>  |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 149.9            | 147.6               | -1.6%  | 162.8            | 156.9               | -3.6%  |
| FAPRI-Missouri                     | 149.4            | 144.2               | -3.5%  | 154.3            | 151.2               | -2.0%  |
| <b>Barley area (mio ha)</b>        |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 10.9             | 11.1                | 2.5%   | 10.5             | 11.1                | 5.0%   |
| FAPRI-Missouri                     | 10.8             | 11.1                | 3.6%   | 10.7             | 11.0                | 2.6%   |
| <b>Barley domestic use (mio t)</b> |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 43.1             | 44.2                | 2.6%   | 43.5             | 44.6                | 2.4%   |
| FAPRI-Missouri                     | 43.7             | 44.4                | 1.5%   | 44.5             | 45.1                | 1.4%   |
| <b>Barley market price (€/t)</b>   |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 118.9            | 107.5               | -9.6%  | 119.9            | 109.5               | -8.7%  |
| FAPRI-Missouri                     | 118.2            | 108.1               | -8.5%  | 118.8            | 110.7               | -6.8%  |
| <b>Maize area (mio ha)</b>         |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 3.85             | 3.91                | 1.4%   | 3.74             | 3.87                | 3.5%   |
| FAPRI-Missouri                     | 4.00             | 4.10                | 2.5%   | 3.97             | 4.00                | 0.8%   |
| <b>Maize market price (€/t)</b>    |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 122.9            | 107.9               | -12.2% | 123.8            | 109.9               | -11.2% |
| FAPRI-Missouri                     | 133.6            | 120.6               | -9.7%  | 132.6            | 125.5               | -5.4%  |
| <b>Oilseed area (mio ha)*</b>      |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 3.67             | 3.54                | -3.8%  | 3.55             | 3.41                | -4.2%  |
| FAPRI-Missouri                     | 5.69             | 5.51                | -3.2%  | 5.64             | 5.48                | -2.8%  |

\* Soybeans and rapeseed in the FAPRI-Iowa State analysis; soybeans, rapeseed, and sunflower seed in the FAPRI-Missouri analysis.

In both analyses, total meat production in 2005 changes by less than 1 % between the baseline and the Agenda 2000 scenario. Lower cereal prices, however, encourage livestock producers to replace some cereal substitutes with cereals in livestock rations. In both analyses, this effect is small, and total feed consumption of cereals increases by less than 2 % under Agenda 2000 relative to the baseline. Comments received after release of the reports suggest that the analyses may understate the potential for further expansion of cereal use in livestock rations.

The reduction in intervention prices and the increase in production result in a significant reduction in EU cereal prices. These lower prices enable the European Union to increase wheat exports without the aid of export subsidies. As world markets provide support for domestic EU markets, cereal prices decline by less than the 15 % reduction in intervention prices. In 2002, cereal prices are between 6 and 12 % below baseline levels, depending on the cereal and the study. By 2005, world markets provide even greater support to EU cereal markets and the decline in EU prices relative to the baseline is between 4 and 11 %. Increased EU exports mean that world cereal prices are reduced slightly from baseline levels.

Because market prices generally exceed the new, lower intervention prices, total cereal intervention stocks are smaller under Agenda 2000 than in the baseline. Under the assumptions of the FAPRI analyses, significant intervention buying would occur only when yields are unexpectedly high or demand is unexpectedly low. In most years, EU cereal prices would be supported by world markets, not by intervention buying.

Exchange rate assumptions account for most of the differences between the two studies in the cereal sector results. The weaker euro in the FAPRI-Missouri study facilitates greater levels of unsubsidised wheat exports, even in the baseline scenario. This allows set-aside rates to be set at lower levels in order to permit more cereal production to meet world demand.

This relatively optimistic view of the EU cereal markets is contingent, of course, on a relatively optimistic view of world cereal markets. Both FAPRI studies are conditioned by a FAPRI baseline that indicated a recovery in world markets from current depressed levels. As an aside, it should be noted that new long-term projections being prepared by FAPRI at the end of 1999 indicate a slower world market improvement. A weaker recovery in world cereal markets may delay the onset of unsubsidised wheat exports and may make unsubsidised barley exports impossible.

## **4.2 Livestock and meat sector results**

Lower beef support prices and lower feed prices translate into lower prices for all major categories of livestock and poultry under the Agenda 2000 CAP reform scenario. Beef prices decline the most in response to the reduction in support prices. Suckler cow inventories and beef production are both reduced slightly from baseline levels. Beef consumption increases in response to lower prices, and beef stocks are reduced dramatically from the very high levels in the baseline scenario. Changes in pork, poultry, and sheep meat production are modest, as lower feed prices are offset by downward pressure on prices resulting from the lower beef prices (cf. table 3.4).

Many of the differences between the two FAPRI studies can be explained by the assumed differences in the potential for unsubsidised beef exports. In the FAPRI-Iowa State

analysis, the reduction in EU market prices results in significant unsubsidised exports, even though the study's assumption of a stronger euro tends to make EU products less competitive in world markets than the weaker euro in the FAPRI-Missouri analysis. In contrast, the FAPRI-Missouri analysis assumes that EU beef exports would actually fall below baseline levels (and below WTO limits on subsidised exports), as the Commission would do less to encourage subsidised exports when such exports are not necessary to avoid intervention stock accumulation. With the different beef export assumptions, EU cattle prices are lower in the early years of the FAPRI-Missouri analysis, putting more pressure on prices of other meats.

**Table 3.4 Livestock and meat sector results**

|                                     | Baseline<br>2002 | Agenda 2000<br>2002 | Change | Baseline<br>2005 | Agenda 2000<br>2005 | Change  |
|-------------------------------------|------------------|---------------------|--------|------------------|---------------------|---------|
| <b>Suckler cows (mio head)</b>      |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State                    | 11.7             | 11.7                | -0.4%  | 11.6             | 11.5                | -0.2%   |
| FAPRI-Missouri                      | 11.6             | 11.2                | -3.6%  | 11.5             | 11.2                | -2.6%   |
| <b>Beef production ('000 t)</b>     |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State                    | 7777             | 7745                | -0.4%  | 7701             | 7663                | -0.5%   |
| FAPRI-Missouri                      | 7686             | 7562                | -1.6%  | 7584             | 7419                | -2.2%   |
| <b>Beef consumption ('000 t)</b>    |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State                    | 7181             | 7281                | 1.4%   | 7100             | 7322                | 3.1%    |
| FAPRI-Missouri                      | 7170             | 7401                | 3.2%   | 7069             | 7269                | 2.8%    |
| <b>Beef ending stocks ('000 t)*</b> |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State                    | 409              | 208                 | -49.2% | 1142             | 217                 | -81.0%  |
| FAPRI-Missouri                      | 613              | 137                 | -77.7% | 1005             | 0                   | -100.0% |
| <b>Beef net exports ('000 t)</b>    |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State                    | 429              | 488                 | 13.7%  | 426              | 392                 | -7.9%   |
| FAPRI-Missouri                      | 398              | 333                 | -16.3% | 397              | 150                 | -62.2%  |
| <b>Cattle reference (€/100 kg)</b>  |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State                    | 129              | 120                 | -6.9%  | 129              | 112                 | -12.9%  |
| FAPRI-Missouri                      | 131              | 112                 | -14.2% | 129              | 113                 | -12.1%  |
| <b>Pork production ('000 t)</b>     |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State                    | 17330            | 17401               | 0.4%   | 17632            | 17692               | 0.3%    |
| FAPRI-Missouri                      | 17227            | 17173               | -0.3%  | 17501            | 17416               | -0.5%   |
| <b>Pork consumption ('000 t)</b>    |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State                    | 16262            | 16325               | 0.4%   | 16571            | 16619               | 0.3%    |
| FAPRI-Missouri                      | 16242            | 16173               | -0.4%  | 16505            | 16412               | -0.6%   |
| <b>Pork reference (€/100 kg)</b>    |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State                    | 130              | 125                 | -4.0%  | 137              | 131                 | -4.6%   |
| FAPRI-Missouri                      | 127              | 121                 | -4.9%  | 128              | 123                 | -3.2%   |
| <b>Broiler production ('000 t)</b>  |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State (EU-15)            | 6700             | 6767                | 1.0%   | 6902             | 6934                | 0.5%    |
| FAPRI-Missouri (EU-12)              | 6183             | 6158                | -0.4%  | 6351             | 6320                | -0.5%   |
| <b>Broiler consumption ('000 t)</b> |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State (EU-15)            | 6220             | 6270                | 0.8%   | 6452             | 6468                | 0.3%    |
| FAPRI-Missouri (EU-12)              | 5674             | 5641                | -0.6%  | 5871             | 5837                | -0.6%   |
| <b>Chicken price (€/100 kg)</b>     |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State                    | 121              | 115                 | -4.7%  | 129              | 123                 | -4.5%   |
| FAPRI-Missouri                      | 135              | 129                 | -4.7%  | 136              | 132                 | -3.3%   |
| <b>Sheepmeat price(€/100 kg)</b>    |                  |                     |        |                  |                     |         |
| FAPRI-Iowa State                    | 336              | 332                 | -1.4%  | 338              | 332                 | -1.7%   |
| FAPRI-Missouri                      | 332              | 320                 | -3.7%  | 342              | 330                 | -3.7%   |

\* Total ending stocks in the FAPRI-Iowa State analysis; intervention stocks in the FAPRI-Missouri analysis.

As with cereals, the estimated beef price declines because of Agenda 2000 reforms are significantly less than the reduction in support prices. In the FAPRI-Iowa State analysis, EU prices eventually are supported by world market prices, and EU cattle prices tend to move with U.S. prices. In the FAPRI-Missouri analysis, world prices are less of a factor. EU cattle prices decline more in the early years of the FAPRI-Missouri analysis, when beef stocks are liquidated, and less in later years.

In both analyses, the reduction of suckler cow payment quotas and lower beef market prices result in reduced suckler cow inventories. The effect is particularly pronounced in the FAPRI-Missouri analysis, where it is estimated that very few beef producers would choose to hold suckler cows that are not eligible for direct payments. Offsetting the reduction in suckler cow inventories is the increase, relative to the baseline, in dairy cow numbers because of the increase in milk quotas. The net effect is that total cow numbers and total cattle slaughter are largely unchanged from baseline levels. Slaughter weights decline in response to lower cattle prices, and so beef production is modestly lower under Agenda 2000 than in the baseline.

While the absolute differences are modest, the two studies do indicate different directional effects on pig meat and poultry production. In the FAPRI-Iowa State analysis, the effect of lower feed prices more than offsets the effect of more competition from low-price beef, and pig meat and poultry production under Agenda 2000 slightly exceeds baseline levels. In the FAPRI-Missouri analysis, the beef competition effect dominates, and pig meat and poultry production fall slightly short of baseline levels.

### **4.3 Dairy sector results**

Dairy sector impacts of Agenda 2000 are limited in the period between 2000 and 2004. The slight increase in quota for selected countries results in a small increase in milk production and a slight reduction in milk and dairy product prices under Agenda 2000 relative to the baseline. Further quota expansion and reduced intervention prices result in lower dairy market prices after 2005. As with other products, however, the estimated reductions in dairy market prices are smaller than the reduction in intervention prices (cf. table 3.5).

Milk production increases under Agenda 2000 are slightly smaller than the increases in production quota. In the early years of the analysis, part of the reason is that the quota increases granted selected countries largely ratify existing production levels. In later years, the decline in milk prices means that some producers may be slightly less likely to overfill or slightly more likely to under-fill quotas. Relative to the baseline, the Agenda 2000 scenario results in slower reductions in dairy cow numbers and faster increases in production per cow. Changes in cow numbers account for most of the change in milk production relative to the baseline, as lower milk prices moderate the increase in milk yields that might otherwise result from an increase in quotas.

With reduced intervention prices, market prices for skim milk powder and butter generally decline more sharply than cheese prices after 2005. As a result, cheese production absorbs a disproportionate share of the increase in milk production. Consumption of drinking milk and cheese increases in response to lower market prices. For butter and skim milk powder, the effects of lower market prices are offset by assumed reductions in consumption subsidies.

In the FAPRI-Missouri analysis, EU skim milk powder exports are limited by the WTO limits on subsidised exports in both the baseline and Agenda 2000 scenarios. In the FAPRI-Iowa State study, baseline EU powder exports are slightly below the WTO limits in the later years of the analysis, and the Agenda 2000 scenario results in further declines as exportable supplies diminish in response to lower production and stock levels. For butter, Agenda 2000 exports under both FAPRI studies exceed baseline levels in the early years as the Commission disposes of some of the increase in milk production in foreign markets. In the later years, butter exports fall slightly short of baseline levels due to a projected reduction in exportable supplies.

**Table 3.5 Dairy sector results**

|                                    | Baseline<br>2005 | Agenda 2000<br>2005 | Change | Baseline<br>2007 | Agenda 2000<br>2007 | Change |
|------------------------------------|------------------|---------------------|--------|------------------|---------------------|--------|
| <b>Milk cows (mio head)</b>        |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 19.5             | 19.7                | 1.0%   | 19.1             | 19.4                | 1.6%   |
| FAPRI-Missouri                     | 19.4             | 19.6                | 0.8%   | 18.9             | 19.2                | 1.5%   |
| <b>Milk production (mio t)</b>     |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 120.3            | 121.7               | 1.2%   | 120.3            | 122.3               | 1.7%   |
| FAPRI-Missouri                     | 120.0            | 121.3               | 1.1%   | 119.9            | 122.0               | 1.7%   |
| <b>Milk price (€/100 kg)</b>       |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 30.0             | 29.0                | -5.0%  | 31.0             | 28.0                | -9.5%  |
| FAPRI-Missouri                     | 29.6             | 28.4                | -4.0%  | 29.6             | 27.1                | -8.5%  |
| <b>Cheese production ('000 t)</b>  |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 6313             | 6424                | 1.8%   | 6423             | 6619                | 3.1%   |
| FAPRI-Missouri                     | 6278             | 6361                | 1.3%   | 6375             | 6536                | 2.5%   |
| <b>Cheese consumption ('000 t)</b> |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 6004             | 6091                | 1.5%   | 6109             | 6268                | 2.6%   |
| FAPRI-Missouri                     | 5952             | 6021                | 1.2%   | 6040             | 6182                | 2.4%   |
| <b>Cheese exports ('000 t)</b>     |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 426              | 439                 | 2.9%   | 431              | 456                 | 5.7%   |
| FAPRI-Missouri                     | 439              | 448                 | 2.0%   | 448              | 459                 | 2.4%   |
| <b>Cheese price (€/100 kg)</b>     |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 494              | 473                 | -4.2%  | 504              | 465                 | -7.8%  |
| FAPRI-Missouri                     | 475              | 457                 | -3.7%  | 475              | 439                 | -7.5%  |
| <b>Butter production ('000 t)</b>  |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 1752             | 1764                | 0.7%   | 1748             | 1746                | -0.1%  |
| FAPRI-Missouri                     | 1704             | 1717                | 0.7%   | 1695             | 1700                | 0.3%   |
| <b>Butter exports ('000 t)</b>     |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 211              | 223                 | 5.8%   | 213              | 194                 | -9.0%  |
| FAPRI-Missouri                     | 192              | 200                 | 4.4%   | 193              | 191                 | -0.8%  |
| <b>Butter stocks ('000 t)</b>      |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 195              | 201                 | 3.4%   | 177              | 135                 | -23.6% |
| FAPRI-Missouri                     | 223              | 228                 | 2.3%   | 218              | 216                 | -0.8%  |
| <b>Butter price (€/100 kg)</b>     |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 364              | 345                 | -5.1%  | 367              | 327                 | -11.0% |
| FAPRI-Missouri                     | 361              | 348                 | -3.5%  | 360              | 326                 | -9.3%  |
| <b>SMP production ('000 t)</b>     |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 1009             | 1001                | -0.8%  | 974              | 915                 | -6.1%  |
| FAPRI-Missouri                     | 1042             | 1042                | 0.0%   | 1026             | 991                 | -3.3%  |
| <b>SMP exports ('000 t)</b>        |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 261              | 273                 | 4.5%   | 258              | 214                 | -17.2% |
| FAPRI-Missouri                     | 272              | 272                 | 0.0%   | 272              | 272                 | 0.0%   |
| <b>SMP stocks ('000 t)</b>         |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 193              | 225                 | 16.7%  | 189              | 129                 | -31.8% |
| FAPRI-Missouri                     | 214              | 254                 | 18.7%  | 211              | 207                 | -1.9%  |
| <b>SMP price (€/100 kg)</b>        |                  |                     |        |                  |                     |        |
| FAPRI-Iowa State                   | 219              | 205                 | -6.3%  | 224              | 198                 | -11.5% |
| FAPRI-Missouri                     | 209              | 196                 | -6.2%  | 209              | 182                 | -13.0% |

Given FAPRI projections for world dairy product prices, it appears unlikely that the European Union would be able to export significant quantities of butter or milk powder without the use of export subsidies. Both analyses estimate that lower EU cheese prices will facilitate a modest (2 to 5 %) increase in unsubsidised exports of certain cheeses in particular markets, but EU bulk cheeses are likely to remain uncompetitive with product from Australia, New Zealand, and other low-cost producers.

## 5. Concluding comments

The two FAPRI studies of the Agenda 2000 reforms indicate that the reforms are likely to reduce EU market prices for cereals, meats, and dairy products relative to a continuation of previous policies. In general, however, the estimated market price reductions are smaller than the reductions in support prices mandated by Agenda 2000.

Especially in the case of wheat, the reforms are likely to facilitate unsubsidised exports when world market conditions improve from their current depressed state. EU beef, pig meat, poultry, and cheese are also more likely to be competitive in world markets because of the reforms. In contrast, the reforms are less likely to facilitate unsubsidised exports of milk powder and butter, and unsubsidised barley and maize exports appear less likely than unsubsidised wheat exports.

In the cereal and beef sectors, the reforms should reduce the likelihood that the European Union will accumulate large quantities of intervention stocks. In contrast, the short-run effect of increasing milk quotas may be an increase in intervention stocks. Only when intervention prices are reduced after 2005 is balance restored to dairy markets.

While results of the two FAPRI analyses are very similar, many of the differences can be attributed to different exchange rate assumptions. This illustrates the point that the Agenda 2000 reforms to the CAP make EU markets more strongly affected by changes in world market conditions than in the past.

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