Economic Analysis of Policy Changes in the Beef and Sheep Sectors

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Summary

The work reported in this document commenced in 1997 under the auspices of the FAPRI-Ireland Partnership. It documents the development of aggregate commodity level models for the beef and sheep sectors, and their subsequent simulation under different policy and macroeconomic environments. Companion reports document the development of similar models for other commodities, and of farm level models.

Objectives
The objective of the modelling exercise was the estimation of a set of models that would provide a means by which all those involved in the beef and sheep sectors could examine the impact of changes in policy and the macroeconomic environments on the beef and sheep sectors. The results of the FAPRI-Ireland model simulations, which examined the Agenda 2000 proposals, the final (Berlin Agreement) Agenda 2000 package, and alternative exchange rate scenarios, are presented here.

Methodology
The methodology used in the construction and running of the models follows closely that developed by the Food and Agriculture Policy Research Institute (FAPRI), where analysis of this type has been successfully carried out over a number of years. Sectoral commodity models were built that incorporate the main relationships between economic and biological factors within the sector. These relationships were estimated using time series data where appropriate. The commodity models are linked together and simulated as a system. Linkages are also made to a model of the EU and the FAPRI world model system.

Key Findings
It was found that the changes made to the CAP under Agenda 2000 would have the greatest impact in the beef sector. The initial proposals made in 1998 would have had a significant impact on livestock farming in Ireland. In particular, large reductions in the number of suckler cow premia payments would have impacted negatively on the sector. The large drop in price coupled with the fall in the cow herd would have resulted in a dramatic fall in incomes. (Any fall in price in the EU is magnified in Ireland given its position as a major exporter). It was found that the market price was likely to balance at a level above the support price under Agenda 2000.

In the final, agreed, Agenda 2000 package, the reduction in the number of suckler cow premia that could be paid in Ireland was moderated. In the analysis of the final (Berlin) agreement the increase in the value of payments were sufficient to offset the drop in market returns, resulting in the sector's revenue staying constant.

As beef prices move towards world prices the importance of the euro/US dollar exchange rate will increase. There is likely to be increased volatility on the beef market as a result of such a development. In order to show the sensitivity of the projections to the level of the /US dollar exchange rate, several scenarios, incorporating alternative paths for the euro, were examined. It was found that as the gap between EU and world beef prices was substantial, the impact of exchange rates had only a small impact on the market. This was because the EU would be likely to absorb any change in exchange rates through savings on the cost of the export refund programme.

Introduction

The FAPRI-Ireland Partnership is a research consortium comprising of Teagasc, FAPRI, Irish Universities, and other agri-food interests. Its purpose is to provide the agri-food sector in Ireland with a tool with which to evaluate the impact of changes in policy and other developments on the evolution of the sector. In this report the focus is on the work done on the beef and sheep sectors. It is only part of the overall project. The other models are detailed in associated reports (Donnellan and Fingleton, 2001; Hennessy, 2001; McQuinn, 2001).

The most substantial change in the environment facing beef producers in the period covered by this report was the Agenda 2000 agreement. The problems associated with a possible build up of intervention stocks resulted in widespread changes in the way that the beef sector was supported. Although sheep sector changes under Agenda 2000 were limited, the interaction between beef and sheep production meant that changes in beef policy would affect the sheep sector.

One of the main motivations of the Agenda 2000 reform was an attempt to make the EU beef (and wider EU agricultural sector) more market driven, with beef prices in the EU converging with world prices. As this convergence occurs, the influence of exchange rates on prices will increase. This report includes results that take account of the impact of changes in exchange rates on the projections for the sector.

In all the analyses the approach is first to determine a baseline, or no policy change, scenario. This provides a starting point against which the subsequent analyses can be compared. This baseline includes forecasts of macroeconomic variables. The baseline assumes “normal” weather conditions prevail throughout the projection period.

An important part of the specification, estimation, validation, and simulation of the models is the input of experts working in the commodity sectors. Both the beef and sheep projects have benefited from high quality input from these review groups. The authors would like to take this opportunity to thank all those involved, and hope that they will continue to contribute in the future.

A Note on Interpretation

The work that is discussed in this report is taken from the period 1997 to mid-2000. Even a cursory examination of the beef market over this period illustrates both the market and policy volatility facing beef producers. This volatility has affected the analysis undertaken. In particular, the baseline has been significantly revised over time as policy has changed. Thus, when examining the results presented here readers should note when the projections were generated. Also, the year of comparison for the policy changes examined differs between analyses. For a baseline that incorporates the latest market and policy developments the interested reader should refer to the most recent FAPRI-Ireland publications.

Details of these are available from our website, go to http://www.tnet.teagasc.ie/fapri

1 Agenda 2000 March 1998 Commission Proposals

A combination of factors, both external and internal to the EU, led to proposals for the reform of the CAP as part of Agenda 2000. The results of the analysis of these **proposals** are presented in section 1 of this report. The final reforms agreed differed substantially from those in the original proposal. Analysis of these is given in section 2.

There were two related problems in the analysis of the initial proposals for reform of the CAP under Agenda 2000. The first problem was that the preliminary nature of the proposals meant that a number of different interpretations were possible about the details of the proposed changes. The second problem was that even after the reforms, the Commission would retain at least some scope to manipulate the market management tools available to it. As a consequence the analysis carried out reflects one of the many possible interpretations of the proposal and assumptions relating to the Commission's behaviour.

1.1 The Proposals

Changes to the beef sector common market organisation (CMO) were the most comprehensive of all proposed CMO reforms. In common with milk and cereals there were substantial differences between the proposals for reform of the beef CMO and the final agreement. In the beef sector the pressing need for reform meant that reform was not delayed. The simulation assumed that:

- The basic special beef premium increased from 108.7 ECU to 170 ECU in three steps. The basic suckler cow premium increased from 114.9 to 180 ECU in three steps.
- Further payments were facilitated by the introduction of a national envelope that would be distributed depending on the particular country's conditions. In this simulation the envelope was assumed to be paid in a production neutral manner. The quota on suckler cow premia in Ireland will be reduced from 1,114,000 to 1,020,606.
- The ceiling on special beef premia claims remained at 1,002,458.
- There was the opportunity under the proposals for up to 20 per cent of the available suckler cow premia to be claimed on heifers. It was assumed that the up-take on this option would be minimal (this assumption was subsequently changed and is detailed below).
- Extensification premia are operated in a budget neutral manner. The payment level was therefore adjusted so that the value of total claims could not exceed the 1997 level.

The Impact on the EU Beef Sector

Under the baseline, the outlook for the beef sector was projected to be bleak. A continued imbalance between supply and demand within the EU was projected, resulting in a large build up of intervention stocks, and a continued depression of prices. Intervention stocks of beef were projected to stand at over 1 million tonnes in 2005. This accumulation of intervention stocks was one of the main motivations for the reform proposals.

The details of the assumptions and findings of FAPRI's analysis of the impact of the Agenda 2000 proposals on the European beef sector are presented in Young (1998). They found that the beef market at the EU level balanced at a price above the proposed market support price by 2003. Once intervention stocks were eliminated the European Commission faced a choice. It could either allow prices to rise, or reduce the amount of subsidised exports. FAPRI modelled both of these scenarios, in the first case letting prices rise towards their baseline levels. In the second scenario the Commission could take the opportunity to reduce the volume of subsidised exports, and this reduced the price of beef. The level of subsidised exports was reduced to a point where the price fall was exactly offset by the increased compensation. It is the output of the Irish model under this "Export Revenue Parity" scenario that is presented here. Table 1 provides details of the FAPRI model projections of the key EU beef sector variables for 2005.

Table 1: FAPRI EU Beef Sector Projections Under Agenda 2000 Scenario.

		Baseline 2005	Agenda 2000 2005	%Difference
Beef Reference Price	ECUs/100kg	238	192	-19
Production	(000) head	7,461	7,361	-1
Consumption	(000) head	7,035	7,298	+4
Exports	(000) head	822	558	-32
Stocks at Year End	(000) head	1,314	436	-67

Source: FAPRI, 1998.

The Impact on the Irish Beef Sector

The bleak outlook for the EU beef sector in a no reform scenario (the baseline) would have especially unfavourable implications for the beef sector in Ireland. Ireland's position as a net exporter means that in terms of price movements at the Irish market level, imbalances in the EU market are amplified. When there are periods of over-supply in the EU market, Ireland tends to be a major contributor to intervention purchases, and as a consequence, Irish prices are depressed relative to those in other EU markets.

The price reductions at an EU level feed back into the Irish models, as do the changes regarding intervention behaviour and subsidised exports by the Commission. There are other changes in Agenda 2000 that also feed into the livestock models, particularly those that affect the cereals and dairy sectors. These other effects are handled by the inter-model linkages. The provision of extra dairy quota under the proposals produced a small increase in the number of dairy cows in Ireland. This led to an increase in the number of calves available and in the volume of cull cow beef from this source. The changes to the cereal regime meant a slight reduction in feed prices. Feed per head declined, however, because the fall in carcass weights and stocking density rates offset the lower feed prices. Feed costs were projected to fall by 11 per cent compared to the baseline in 2005. In addition, a reduction in intensity of production reduced fertiliser application. These changes in costs, when taken together, reduced total costs in the Irish beef sector by 5 per cent.

Table 2: Projections for the Irish Beef Sector Under Agenda 2000.

		Baseline 2005	Agenda 2000 2005	% Difference
Adult Cattle Price	IR£/100kg	97	74	-24
Beef Cows	(000) head	1,157	1,070	-8
Volume of Output	(000) head	2,012	1,943	-3
Value of Output	IR£m	968	635	-34
Total Payments	IR£m	534	795 (762)	+49 (43)
Total Revenue	IR£m	1,502	1,430 (1397)	-5 (-7)
Proportion of Revenue as Payments		36%	56% (55%)	

Source: FAPRI - Ireland Partnership model. Figures in brackets do not include dairy/beef payment.

Taken together, these factors implied that the adult cattle price in Ireland was projected to fall by 24 per cent under the proposals. The large number of cows leaving the herd meant that Irish cull cow prices fell further, by 26 per cent against the baseline level. Calf prices also declined, due to the reduction in adult prices. However, the effect of the decline in adult cattle prices on calf prices was mitigated by the increase in payments, some of which are capitalised into the calf price. The supply of calves also fell and this improved the calf price, which dropped only by 5 per cent relative to the baseline level.

The number of beef cows falls towards its new quota limit. Under these conditions not many suckler cows would be held that do not claim the suckler premia. The reduction in beef cows was offset slightly by the increase in dairy cows, but the volume of beef output was still projected to fall by 4 per cent. Falling prices, and an increase in the importance of payments not tied to carcass weights, meant that carcass weights fell by 11 per cent relative to the baseline in 2005. This reduction follows from the projected decrease in the level of inputs, lighter animal breeds, and earlier slaughtering.

Overall, the impact of the Agenda 2000 proposals was to reduce the volume of beef output, reduce the price, and reduce carcass weights. These reductions feed through into the value of the sector as a whole, which fell by 34 per cent from its baseline value under the Agenda 2000 proposals. The fall in the value of output was partly compensated by a 56 per cent increase in payments. The suckler cow premia payment also increased, but this increase is partly offset by a fall in the national suckler cow quota. The rise in special beef premia and provision of a national envelope of over £100 million was insufficient to offset the fall in the market value of the sector's output. If the compensation to dairy farmers for their loss of income due to the fall in beef prices is included, the revenue of the sector fell by 5 per cent.

It was assumed in this simulation that the more stringent stocking density restrictions had a minimal effect on cattle numbers. This is because the scenario generated such a large reduction in the number of cows, and therefore cattle, that the effect of such restrictions was limited.

1.2 The Impact on the Sheep Sector

As in the beef sector, a drop in EU prices for lamb tends to lead to a larger drop in lamb prices in Ireland. This is the case under the proposals where the beef price decline was projected to impact - via substitution on the demand side - on the sheep sector, as shown in Table 3. Since the value of the ewe premia was calculated as the difference between the EU reference price and the basic price, Irish producers are not compensated for the extra fall in their prices. This leads to a marginal decline in the ewe flock, sheep output volume, and sheep output value. The total revenue of the sector falls by 7 per cent. Again, it was assumed that the reduction in cattle numbers under Agenda 2000 offset the tougher stocking density restrictions, and therefore the size of the sheep flock was not affected by this change.

Table 3: Livestock Changes Under Agenda 2000.

		Baseline 2005	Agenda 2000 2005	% Difference
Sheep Price	IR£/head	49	46	-7
Ewe Flock	(000) head	4,155	4,021	-4
Sheep Output Volume	(000) head	4,199	4,044	-5
Sheep Output Value	IR£m	175	157	-11
Sheep Output Payments	IR£m	109	109	0
Sheep Total Revenue	IR£m	284	254	-7

Source: FAPRI - Ireland Partnership model.

2 Analysis of the Berlin Agreement

In this section of the report, the impact of the March 1999 Agenda 2000 (Berlin) Agreement, as it related to agriculture, is presented. In 1999 the problems for the beef sector in Ireland continued. A fodder crisis and poor prices for Irish cattle continued to cause problems for producers, and the outlook at the time was poor. The spectre of a large build up of intervention stocks when schemes such as the calf disposal and over thirty month (OTMS) scheme were terminated resulted in changes to the beef CMO under the Berlin Agreement that were the most comprehensive of all the CMO reforms. The Agenda 2000 agreement dramatically reduced the level of beef support prices. By reducing support prices the European Commission hoped to bring the market into balance, with producers being compensated through the increase in direct payments payable to the sector.

The analysis of the Agenda 2000 agreement gave rise to problems similar to those mentioned in Section 1. Again, the path that the sector takes is particularly sensitive to the behaviour of the Commission. Another difficulty in modelling the sector arose from the fact that the Agreement contained not just changes in prices and payments, the impact of which can be modelled with relative confidence, but there were also changes in the conditions that are attached to these schemes. The lack of historical evidence from which to draw inferences, and the fact that policy changes in different

areas may be very closely linked further complicates analysis. For example, the decision regarding animal mix on farms for producers facing tougher stocking density restrictions and higher extensification payments will be influenced by the ability of the farmer to claim suckler premia on heifers and the earlier payment of special beef premia, in addition to the level of the market prices received for output and the different payment rates. We are less confident in our results regarding these types of changes. The development of farm level models has enabled subsequent analysis to address these issues more comprehensively, see Hennessy (2001) for further details.

The main changes between the initial reforms and those in the final agreement were:

- The reduction in suckler cow quota was moderated, with the new limit set at 1,102,600.
- An increase in the special beef premia limit to 1,077,500.
- Although the intervention price fall of 30 per cent was retained, aids to private storage were introduced, so that the effective support price fell by 20 per cent.
- A two-tier system of extensification premia claim was introduced.

2.1 The Outlook for the EU

Again, the outlook for the beef sector in the absence of reforms was bleak, as shown in the baseline projections. With consumption returning to its long-term downward trend after its recovery post BSE and subsidised exports constrained by the WTO limits, intervention stocks build even with declining dairy cow numbers. In particular, the large increase in intervention stocks has important implications in terms of budgetary expenditure (and pressure on the guideline), and the ability of the EU to meet its GATT commitments, or expand eastwards. The implications for Ireland, from where much of this intervention beef would probably come, were even bleaker.

In the Berlin Agreement scenario it was assumed that the Commission disposed of all of its intervention stocks by the year 2003. The combination of these stocks and the increase in production from the ending of the disposal schemes resulted in a price fall of around 15 per cent in 2003. Thereafter it was assumed that the Commission ran subsidised exports below their WTO maximum stabilising the price reduction at about 12 per cent below the baseline. The price drop in this analysis was lower than that presented in Section 1. Stronger market conditions resulted in a greater than expected drop in intervention stocks and a lessening of the downwards pressure on market prices.

The main impact on cow numbers was projected to come as a result of the changes to suckler cow quota and premia rather than through lower prices. Under the baseline, poor market conditions resulted in the contraction of the suckler herd by around 180,000 cows. The reduction of suckler cow quota and the facility that allows suckler premia to be claimed on heifers resulted in the removal of a further 368,000 cows, as shown in Table 4. Under the Berlin Agreement simulation a small increase in dairy cows partially offset the drop in suckler cows and the small drop in carcass weights. This left total beef production down 2 per cent. The drop in prices results in an increase in the demand for beef, and consumption at the end of the period is up 3 per cent on its baseline value in 2007. The reduction in supply and the strengthening of demand meant that intervention stocks could be removed and subsidised exports reduced by around 35 per cent.

Table 4: EU-15 Main Variables Under Baseline and Agenda 2000.

		1998 (a)	2007 Baseline (b)	2007 Berlin (c)	% Change (b) - (c)
Reference Price	€/100kg	135.2	128.1	112.6	-12
Beef Cows	'000 Head	11,745	11,563	11,195	-3
Production	'000 tonnes	7,542	7,464	7,312	-2
Imports	'000 tonnes	331	353	349	-1
Domestic Use	'000 tonnes	7,230	6,967	7,167	+3
Exports	'000 tonnes	756	751	495	-34
Intervention	'000 tonnes	504	1,212	0	-100

Source: FAPRI (1999).

As noted above, the actual market conditions are very much reliant on the behaviour of the Commission. In particular the price at the end of the period of the Berlin Agreement simulation is down 12 per cent. If the EU were to export the full amount permissible under the current WTO agreement then the price fall would be smaller. The Commission could also have chosen to reduce intervention stocks rapidly over the next two years, therefore leaving less stock to dispose of in the early years of the agreement.

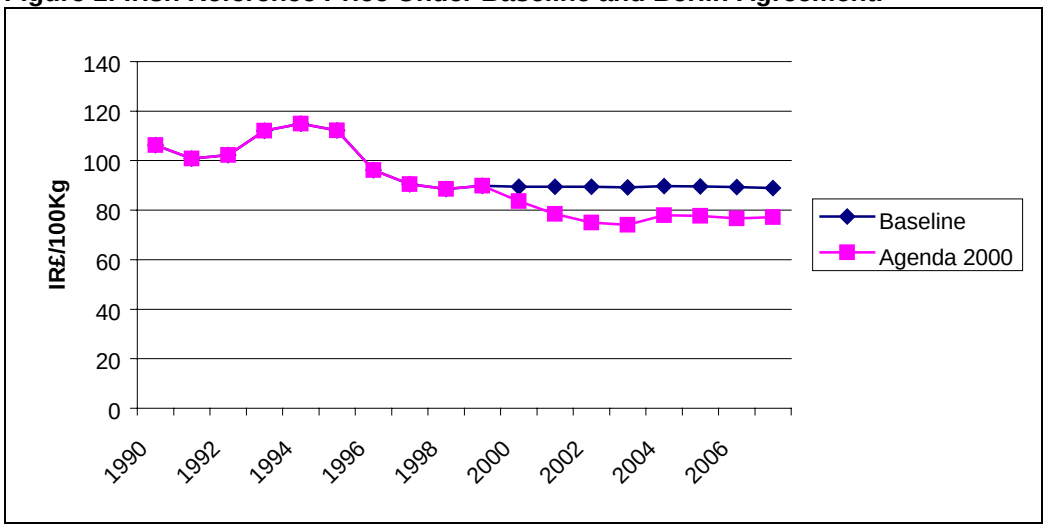
2.2 The Outlook for Ireland

The beef sector in Ireland would clearly face a bleak future in the policy environment as it stood prior to the Berlin Agreement. Under a scenario where there was no Agenda 2000 reform it would be reasonable to assume that a great deal of the build up in EU intervention stocks would be of Irish beef and that penetration of the EU market by Irish beef would be difficult. The key areas where Ireland benefits under the Berlin agreement are:

- The EU market is brought into balance from the changes. It is therefore be easier for Irish beef to penetrate high value EU markets.
- Although the suckler cow quota is reduced marginally, it is some way above the level of the original (March 1998) proposals.
- The higher special beef premia ceiling, in conjunction with the fact that Irish producers claim a greater proportion of payments than their EU counterparts, mean that the Irish beef sector benefits greatly from higher premia payments.
- The market price is likely to settle at a level above that which would leave producers fully compensated.
- The alternative extensification payment regime means that although tougher stocking density calculations remain, widespread forced restructuring of drystock farms will be avoided.

The years prior to 1999 had seen the gap between EU and Irish cattle prices grow. It was expected that there would be some recovery in the Irish price relative to the EU price, especially in a situation where the market was in balance as it is under the Berlin Agreement scenario. In the following simulations it is assumed that the structure and pricing strategy of the industry remains similar to present. The path that prices are projected to take under both the baseline and the Berlin Agreement simulation outlined above are shown in Figure 1.

Figure 1: Irish Reference Price Under Baseline and Berlin Agreement.



Source: FAPRI-Ireland Model.

Under the baseline, although the EU price falls over the period, the Irish price remains constant. This is partially due to the assumption that some of the negative perceptions of Irish beef are reversed and also due to the model projecting an increased proportion of Irish beef going to EU markets. Under the Berlin Agreement, falling prices at the EU level are reflected in the Irish market. Due to its position as a residual supplier of the market, price falls at an EU level result in a greater fall at an Irish level,

although this fall in price is partially offset by increased sales of beef onto the EU market. The Irish price therefore stabilised around 13 per cent below the baseline.

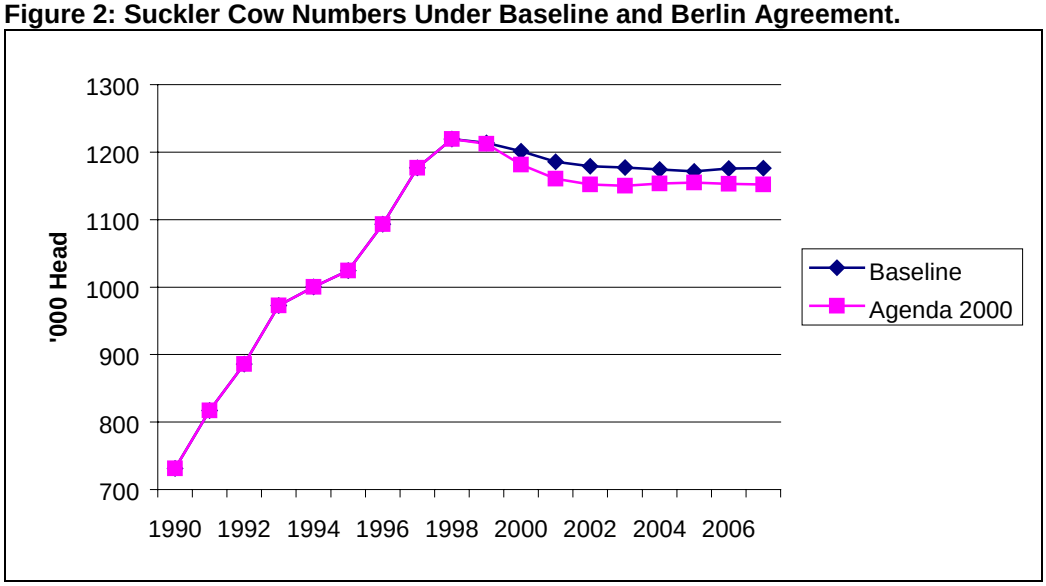
Projections for suckler cow numbers are illustrated in Figure 2. It can be seen that under both policy simulations the number of suckler cows falls from a peak in 1998. Under the baseline, this is due to the fact that poor market conditions mean that there will be fewer cows over the quota limit. In the Berlin Agreement simulation, even though the quota level is reduced only marginally, the cow herd shrinks more rapidly in the early years as suckler premia can be claimed on heifers as well as cows, and because of the reduced economic incentives to hold cows in excess of the smaller cow quota. In the latter periods, higher calf prices as a result of increased direct payments and sharp reductions in dairy cow numbers result in a levelling off of suckler cow numbers.

In the Berlin Agreement simulation it was assumed that the impact of the new extensification scheme is minimal. There is general agreement that those who currently qualify for the lower payment will continue to do so without major adjustments in animal numbers. Those that need to adjust, or producers wishing to avail of the higher rate, may adjust in a number of ways. Animals on which payments cannot be claimed will be vulnerable, such as “over quota” cows or heifers.

The impact of the changes in prices and cow numbers on the sector in Ireland are summarised in Table 5. In the baseline carcass weights fall slightly, and this drop is increased by the price drop under the Berlin Agreement even though the proportion of beef cows in the total cow herd rises. Live exports have risen dramatically in 1999, and were projected to stabilise at their 1999 levels before falling as the gap between Irish and EU prices decreased. Under the Berlin Agreement live exports to the EU rise in relation to the baseline, but this is more than offset by the fall in the export of animals to destinations outside of the EU, that occurs as a consequence of the reduction in subsidised exports outlined above.

The reduction in both dairy and beef cow numbers under both the baseline and Berlin Agreement scenarios resulted in a drop in the volume of output over the simulation period. The net effect of the Berlin Agreement did not reduce the volume of output significantly, since an increase in dairy cows partially offsets the reduction in suckler cows. The value of output under the Berlin Agreement was down significantly. This was partly as a result of the reduction in the volume of output as outlined earlier, the majority of which would have happened even if policy had not changed, because of increasing dairy yields. The fall in prices under the Agreement, coupled with the further drop in carcass weights, meant that the value of output, the revenue that accrues to producers from sales to the market, dropped by 17 per cent in relation to the baseline in 2007.

Figure 2: Suckler Cow Numbers Under Baseline and Berlin Agreement.



Source: FAPRI-Ireland Model.

The drop in revenue that producers received from the market was offset by an increase in the level of direct payments. Comparisons with 1998 are slightly misleading in this respect, as the 1998 payments figure is inflated because some payments were brought forward. With the lower exchange rate assumption, the 2007 baseline figure was therefore significantly lower than that in 1998. Under the Berlin Agreement this figure rises by almost 60 per cent, or nearly IR£300 million. The total revenue of the sector is therefore up 13 per cent on the baseline in 2007 under the Agreement and back to levels comparable to 1998 if payments had not been brought forward. This is despite the fact that there is a large fall in the size of the cattle herd in Ireland of approximately 10 per cent on its 1998 level.

Table 5: Irish Beef Sector: Main Variables Under Baseline and Agenda 2000.

		1998 (a)	2007 Baseline (b)	2007 Berlin (c)	% Change (b) - (c)
Reference Price	IR£/100kg	88.6	89.0	77.2	-13
Beef Cows	'000 head	1,219	1,176	1,152	-2
Total Cows	'000 head	2,528	2,321	2,305	-1
Carcass Weights	tonnes/head	0.306	0.293	0.281	-4
Live Exports	'000 head	176	250	223	-11
Slaughterings	'000 head	1,910	1,755	1,768	1
Volume of Output	'000 head	2,187	1,959	1,943	-1
Value of Output (1)	IR£m	1088	970	801	-17
Direct Payments* (2)	IR£m	622	505	799	+58
Sector Revenue (1)+(2)	IR£m	1,710	1,412	1,600	+13

Source: FAPRI-Ireland Model.
Does not include REPS payments.

2.3 The Outlook for the Sheep Sector

After benefiting from the drop in consumption of beef in the EU due to BSE, increased supplies of sheep meat in the EU market resulted in several years of poor prices for producers. Although some recovery in prices was projected by FAPRI, static consumption levels mean that prices do not return to 1996 levels. The results of the Berlin Agreement simulation for the main indicators of the sheep sector are outlined in Table 6.

Table 6: EU-15 Main Sheep Variables Under Baseline and Agenda 2000.

		1998 (a)	2007 Baseline (b)	2007 Berlin (c)	% Change (b) - (c)
Reference Price	€/100kg	309.1	342.2	336.7	-2
Ewes	'000 head	70,602	69,818	69,281	-1
Production	'000 tonnes	1,145	1,149	1,137	-1
Imports	'000 tonnes	232	235	234	0
Domestic Use	'000 tonnes	1,369	1,381	1,371	-1
Exports	'000 tonnes	3	3	3	0

Source: FAPRI (1999).

It is clear from Table 6 that the projected impact of the Berlin Agreement on the sheep sector was small. Since the beef price does not fall by the full drop in support levels, sheep meat prices are only 2 per cent below their baseline level in 2007. Although the sheep meat price falls, consumption also falls due to the increased competition from beef. Production drops by just 1 per cent.

The potential for major changes resulting from the Agreement arise from changes in stocking density requirements and extensification payment criteria. There are two possible impacts from these sources. The first of these is that existing producers may be squeezed by the new requirements and would remove animals from their holdings. The second is that producers may wish to either enter the scheme or attempt to qualify for the higher payment. In the figures presented in Table 7 the impact was assumed to be minimal.

Table 7: Irish Main Sheep Variables Under Baseline and Agenda 2000.

		1998 (a)	2007 Baseline (b)	2007 Berlin (c)	% Change (b) - (c)
Sheep Price, 40-49kg	IR£/100kg	47.0	50.0	49.1	-2
Ewes	'000 Head	4,532	3,699	3,633	-2
Volume of Output	'000 Head	3,932	3,490	3,412	-2
Value of Output (1)	IR£ Million	162	147	141	-4
Direct Payments* (2)	IR£ Million	117	71	72	1
Sector Revenue (1)+(2)	IR£ Million	280	218	213	-2

Source: FAPRI-Ireland Model.
*Does not include REPS payments.

The price drop in Ireland as a result of the Berlin Agreement was projected to be slightly higher than at the EU level, and the full drop is not therefore compensated by the increase in ewe premia. The net effect of this was a small reduction in the number of ewes, in the value of output, and of sheep sector revenue even with a small increase in direct payments. It is clear that the major change in the sheep sector over the projection period comes from the non-Agenda 2000 effects that are assumed to remove 700,000 ewes from the national flock.

3 Exchange Rates and their Effect on the Beef Sector.

The results that are presented in this section of the paper relate to analysis that was conducted following the Agenda 2000 reforms, and consequently the baseline is one that incorporates the Agenda 200 reforms as the current policy. The object of the analysis was to examine the sensitivity of the FAPRI-Ireland projections to the level of the euro exchange rate and the potential impact of differing euro exchange rate development paths on the economic prospects of Irish agriculture. It should also be noted that the analysis described here was conducted prior to the second BSE crisis.

This baseline analysis assumed that the euro would begin to recover in 2000 from its position at close to parity with the dollar and that it would appreciate gradually over the following two years to reach a sustained rate of $1.22 over the remainder of the projection period. Given the uncertainty surrounding the possible evolution of the euro's value, alternative exchange rate scenarios were generated, providing some sensitivity analysis about the economic prospects of the Irish beef sector under different euro/dollar exchange rates.

3.1 The Outlook for the Beef Sector

The drop in the level of support prices under Agenda 2000 meant that the EU market price was projected to fall as a result of this increased supply in the FAPRI projections. In addition to this the Commission was assumed to reduce export subsidies and therefore stabilise the EU price at about 17 per cent below its 1998 level. The Commission could of course choose to run subsidised exports at a higher level than that which is assumed, which would mean that under the baseline the drop in the market price would not be as pronounced. It may be more realistic to assume that export subsidies are reduced, as the Commission may wish to reduce budgetary expenditure, or avoid higher internal EU prices in the period immediately prior to EU enlargement. There are many precedents for running subsidised exports below their maximum level; indeed that was the case in 1999.

Under the baseline there is a small reduction in the number of suckler cows. The impact of the changes in policy in the beef sector that followed the Agenda 2000 reforms is hard to quantify and is discussed below. Despite the increase in dairy quota there is a significant drop in dairy cow numbers. The resulting drop in cattle numbers and small drop in carcass weights leaves production down 2 per cent, from the 1998 level.

Table 8: EU-15 Main Beef Variables 1998 and Baseline Projection for 2007.

	1998	**2007**	**Change 1998 – 2007**	**% Change 1998 – 2007**
		€/100kg		
Reference Price	135	112	-23	-17%
		'000 head		
Beef Cows	11,633	11,611	-22	0%
		'000 tonnes		
Production	7,624	7,469	-155	-2%
Imports	347	365	18	5%
Domestic Use	7,395	7,209	-186	-3%
Exports	692	625	-67	-10%
Intervention	514	0	-514	-100%

Source: Westhoff and Young (2000).

It is probable that there will be some recovery in the Irish price relative to the EU price over the next ten years, especially in a situation where the EU market was in balance as it was projected to be. However, falling prices at the EU level are reflected in the Irish market. Although there is some convergence between Irish and EU prices, the Irish price stabilises around 14 per cent below the 1998 level.

By 2007 the number of suckler cows was projected to fall significantly from its 1998 peak. In the Berlin Agreement the suckler quota level is reduced marginally, but the major impact on cow numbers comes from a combination of the ability to be able to claim suckler cow premia on heifers and pressures from extensification. This is the source of the major difference between the projections made in Section 2 and those produced here. The adjustment has been made on the basis of returns of extensification forms to the Department of Agriculture, Food and Rural Development, a survey in the Farmers Journal (February 26th, 2000) that showed 48 per cent of suckler farmers surveyed intended to claim SCP on dry heifers, replacement and culling figures, and the advice of industry experts.

The impact of the changes in prices and cow numbers on the sector in Ireland is summarised in Table 5. In the projections, carcass weights fell due to a combination of lower prices and earlier slaughtering due to changes in the payments regime and the increase in importance of payments in farm income as a whole.

Table 9: Irish Main Beef Variables 1998 With Baseline Projections to 2007.

	1998	**2007**	**Change 1998 - 2007**	**% Change 1998 - 2007**
		IR£/100kg		
Adult Cattle Price	170	147	-23	-14%
		'000 head		
Beef Cows	1,217	1,061	-156	-13%
Total Cows	2,525	2,229	-296	-12%
		tonnes/head		
Average Carcass Weight	0.306	0.287	-0.019	-6%
		'000 head		
Live Exports	170	359	189	111%
Slaughterings	1,906	1,688	-218	-11%
Volume of Output	2,176	1,999	-177	-8%
		IR£m		
Value of Output (1)	1087	818	-269	-25%
Direct Payments* (2)	622	771	149	24%
Sector Revenue (1)+(2)	1,709	1,589	-120	-7%

Source: FAPRI-Ireland Partnership Model.
** Does not include REPS payments.*

The reduction in both dairy and beef cow numbers resulted in a drop in the projected volume of output over the simulation period. This decline in the value of beef output was partly as a result of the reduction in the volume of output as outlined, some of which would have happened even if policy had not changed due to increasing dairy yields. The fall in prices, coupled with the further drop in carcass weights, meant that the value of output, the revenue that accrues to producers from sales to the market, dropped by 25 per cent.

The drop in revenue that producers receive from the market was offset by an increase in the level of direct payments. Comparisons with 1998 are slightly misleading in this respect as the 1998 payments figure is inflated because some payments were brought forward from 1999. The total revenue of the sector is therefore down 7 per cent on the baseline in 2007 under the Agreement and back to 1999 levels if payments had not been brought forward. This is despite the fact that there is a large fall in the size of the cattle herd in Ireland relative to its 1998 level.

3.2 The Outlook for the Sheep Sector

Although there are no reforms in the Berlin Agreement that change the CMO for the sheep sector, the changes in the support for the beef sector have consequences for sheep producers. The first of these is that the drop in beef prices will result in a decline in the demand for lamb. The most important changes to the sector may come about as a result of the impact of the revised stocking density calculations and extensification payment regimes. Projections by FAPRI for the main indicators of the sheep sector are outlined in Table 6.

Table 10: EU-15 Main Sheep Variables 1998 With Baseline Projections for 2007.

	1998	2007	Change 1998 - 2007	% Change 1998 - 2007
		€/100kg		
Reference Price	326	332	6	2%
		'000 head		
Ewes	70,253	69,312	-941	-1%
		'000 tonnes		
Production	1,137	1,128	-9	-1%
Imports	238	234	-4	-2%
Domestic Use	1,377	1,359	-18	-1%
Exports	2	3	1	50%

Source: Westhoff and Young (2000).

The projected impact of Agenda 2000 on the sheep sector at an EU level was small. There were cross price effects from other meats on the price of lamb. If Agenda 2000 had not been implemented then the projected lamb price would have been higher. Despite drops in per capita consumption, however, the combination of changes in consumption and production left prices largely unchanged on 1998 levels. Production dropped by just 1 per cent.

The potential for major changes in the sheep sector in Ireland arises from the changes in stocking density calculations and extensification payments. There are two possible impacts from these sources. The first of these is that existing producers may be squeezed by the new requirements and would remove animals from their holdings. The second is that producers may wish to either enter the scheme or attempt to qualify for the higher payment. Another factor impacting on ewe numbers is the fact that relative to other production activities, lamb production is labour intensive, and is as a consequence not suitable for the type of part-time farming systems that are likely to be increasingly popular.[4]

The main change over the outlook period was the large reduction in the number of ewes in the country. It should be noted that the figures above overstate the fall in revenues, as revenue previously claimed as headage and ewe premia will be claimed under other schemes not included in the direct payments included in the FAPRI-Ireland model's calculations.

[4] For projections of farmer numbers see Downey (1999) and Dunne, O' Riordan and Troy (1999).

Table 11: Irish Main Sheep Variables 1998 With Baseline Projections for 2007.

	1998	2007	Change 1998 - 2007	% Change 1998 - 2007
		IR£/100kg		
Sheep Price, 40-49kg	47	48	1	2%
		'000 head		
Ewes	4,532	3,629	-903	-20%
Volume of Output	4,031	3,362	-669	-17%
		IR£m		
Value of Output (1)	163	139	-24	-15%
Direct Payments* (2)	117	93	-24	-21%
Sector Revenue (1)+(2)	280	232	-48	-17%

Source: FAPRI-Ireland Model.
**Does not include REPS payments.*

3.3 Exchange Rate Simulations

The two major reforms of the Common Agricultural Policy (CAP) in the last decade have had the specific aim of bringing EU commodity prices closer to the corresponding world commodity prices. [5] The aim of the European Commission in particular is to bring the EU agricultural sector to a position where its commodities can compete with produce on the world market, without recourse to export subsidies. This means that the exchange rate between the euro and the dollar will assume far greater importance in years to come as EU prices move closer to those which prevail on external world markets. Thus in conducting this type of analysis, the rate of exchange between the euro and the dollar can have substantial implications for the prices projected for many different agricultural commodities, and in turn for the production response of the different countries within the major trading blocks.

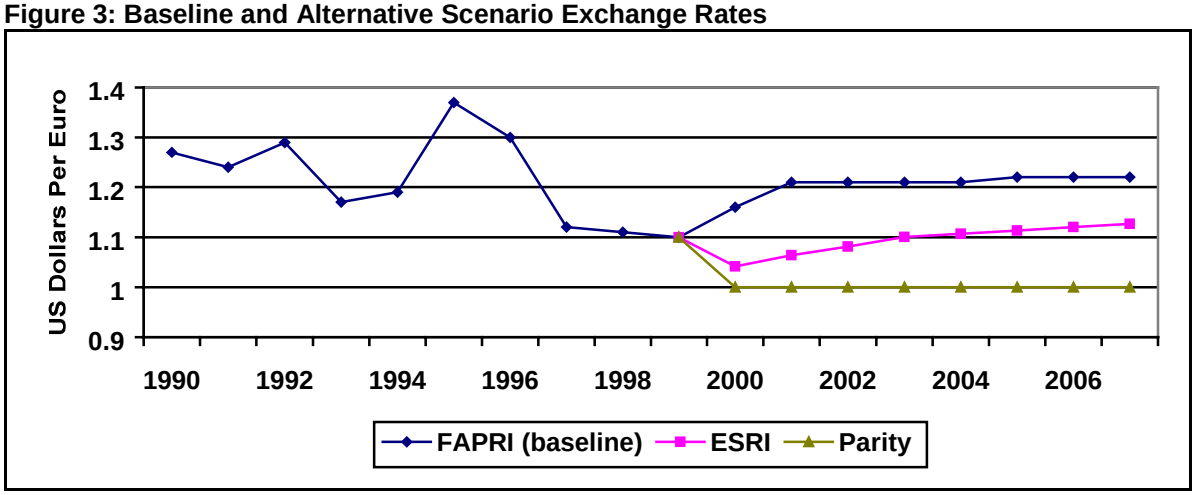
Because of the growing importance of the exchange rate in EU commodity analysis it was decided to produce projections on the basis of three differing exchange rate assumptions. This provides the following advantages over the use of a single exchange rate assumption:

- The provision of the results of extra exchange rate scenarios provides extra information to the policy maker.
- The sensitivity of the agricultural sector, and in turn the projections, to the volatility of exchange rate movements is identified and quantified.
- Quantifying the implications for the international trade in EU commodities establishes a context for the potential implications of future policy changes such as WTO agreements or enlargement of the EU.

Analysis for two alternative (to the baseline) exchange rates was conducted. The first was an ESRI exchange rate forecast for the dollar/euro rate. This involved the euro appreciating over the projection period but not quite as strongly as in the FAPRI-Ireland baseline. By 2007 under the ESRI projections, the euro appreciates to a value of $1.13. The final scenario involved keeping the dollar/euro relationship at parity for the 2000-2007 period. The FAPRI-Ireland model was then used to trace the effects of these two alternative exchange rate scenarios. Results for the different sectors and overall income were then compared with the baseline exchange rate results. Figure 3 plots the paths of the 3 different exchange rates used in the analysis.

[5] For details of the reforms see Mac Sharry (1992) and the Agenda 2000 (1999).

Figure 3: Baseline and Alternative Scenario Exchange Rates

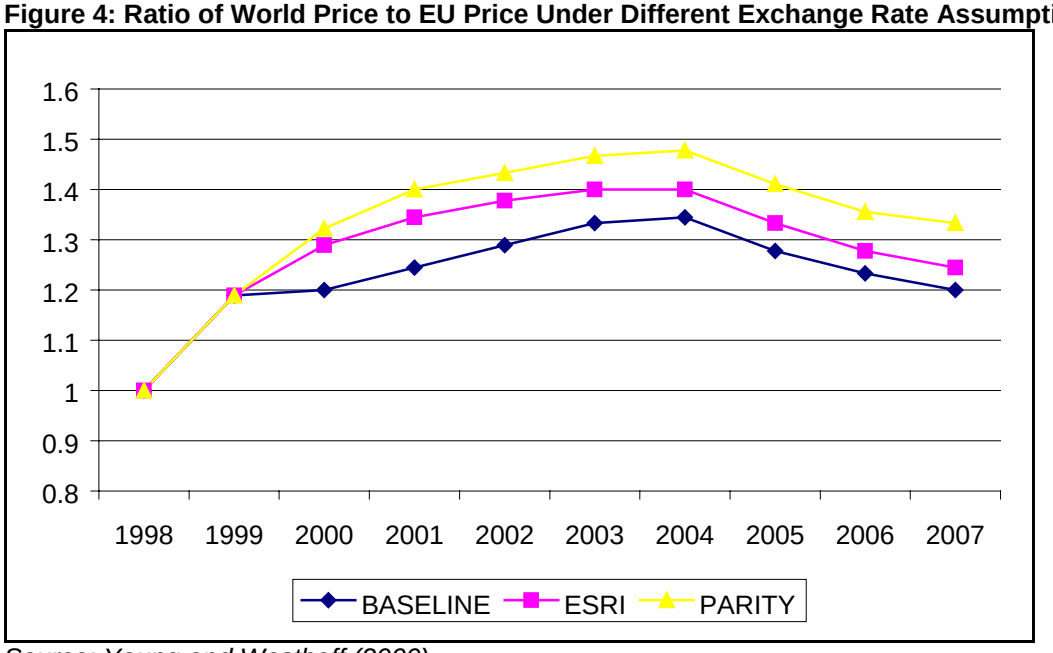


Source: FAPRI and ESRI

It is important when considering the impact of alternative exchange rate paths on the beef sector to remember that the price path for beef is largely determined through the way that the Commission operates subsidised exports. The Commission response to a closure in the gap between world and EU prices is most likely to be one wherein budget savings are made through a reduction in the rate of refund, rather than one in which higher world prices (in euro terms) are reflected in higher internal EU prices. As has been shown in the previous sector level analysis, the number of cows and therefore the volume of output of the sector is largely determined through policy in the form of the dairy quota and suckler cow quota.

There is, however, some reaction to changing relative EU and world beef prices in the model that is used by FAPRI. This in part reflects the fact that under all of the exchange rate paths there is likely to be some unsubsidised export of beef by the end of the period, probably in the form of beef from female cattle. The ratio of EU price to world beef price under each of the exchange rate scenarios is shown in Figure **4**. Currently the EU model links with the world model through the US Nebraska steer price, which is acknowledged as not from a market with which the EU trades. It is assumed here that its movements will mirror that of other "world" prices.

Figure 4: Ratio of World Price to EU Price Under Different Exchange Rate Assumptions.



Source: Young and Westhoff (2000).

The model allows for some reaction of exports to the new exchange rate. In addition the prices of other meats are increased. Therefore under the parity scenario the price of beef in the EU increases by 8 per cent relative to the baseline. This is transmitted back to Ireland where a similar price increase

is experienced. As has already been noted, the output of the beef sector is effectively controlled by policy. A change in the exchange rate, therefore, only has a small impact on numbers, as slightly higher weanling prices encourage more heifers to be put in calf. Overall the market value of the output of the sector is only up by 10 per cent under the parity scenario, and by 4 per cent under the ESRI scenario.

Figure 4 shows the projections for an index of the ratio of Nebraska steer price with the EU reference price projected by FAPRI under the different exchange rate scenarios. The shape of the graph reflects the cycle in US production. The diagram suggests that in 2003 and 2004 there will be a significant closure of the gap between EU and world prices. This may facilitate the unsubsidised export of beef coming from the ending of the "Over Thirty Months Scheme" (OTMS). It should be noted that export refunds on beef from female cattle accounted for 10 per cent of their value in 2000. The figures suggested that unsubsidised exports of this type of beef could occur in the near future. It is unlikely that beef from male animals could be exported without subsidies to any large extent under these projections.

As the EU is a net importer of sheep meat, and there is little scope for the volume of this to increase to any great extent, the sheep meat sector is less responsive to changes in the exchange rate than the beef sector. Any change in the differential between world and EU prices results in a change in the value of the levy on imports. However, the increases in the prices of the competing meats pulled up sheep meat prices. In the "parity" scenario the EU price was 7 per cent higher than the baseline. Again, the impact of this price increase on production was small because of the way that the ewe premia is calculated. The two factors mean that the market value of the sector is up 7 per cent under the parity scenario, and 3 per cent under the ESRI scenario.

4 Conclusions

The objectives of the project were to construct econometric models of the beef and sheep sectors which, together with similar models for the other main agricultural commodity and input sectors in Ireland, would be of use in the analysis of agricultural policy and market changes The analyses described in this report and in the companion reports, Donnellan and Fingleton (2001), Hennessy (2001), and McQuinn (2001), illustrate both the depth and the wide scope of the work that has been accomplished. The period 1997 to 2000 has been a tumultuous time in Irish agriculture. The sector, and especially the beef sector, has been buffeted by large shocks (such as the BSE crisis) and has had to adjust to large-scale policy changes within the EU. The FAPRI-Ireland model has provided decision makers within the beef and sheep sectors, and within the wider Irish agricultural sector, with valuable and timely analysis of the impact of both policy and market developments.

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