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Examining the Relative Competitiveness of Irish Agriculture (1996 – 2003/4)

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Abstract

This paper examines the competitiveness of Irish agriculture compared to that of other EU and non-EU countries. The analysis was based on two main data sources – the Farm Accountancy Data Network (FADN) for years 1996-2003 and the International Farm Comparisons Network (IFCN) for 2003 for beef production and for 2004 for milk production. Results showed that the Irish competitive position compared to other EU and non-EU countries was positive when total cash costs were considered indicating a positive outlook for Irish milk production in the short to medium term. However, as the opportunity costs of owned resources are not included in 'cash cost' calculations, total economic costs which include imputed charges for owned resources were considered to examine the longer term outlook for the competitiveness of the sector. Using this measure, the competitive ranking for Irish agriculture slipped relative to the other countries. It was found that the main reason for the relatively high economic costs on Irish farms was due to the high imputed land and labour costs. These findings could be considered as a warning signal for the future competitive performance for the average sized Irish farm. However, based on FADN data the competitive position of 'larger' Irish dairy farms (in the 50-99 dairy cow size category) did manage to maintain their competitive position within Europe even when total economic costs were considered. Hence, it could be concluded that part of the explanation of the deterioration of competitive ranking for the average Irish dairy farm when total economic costs are considered relates to the relatively low scale of primary agricultural activity in Ireland during this period.

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1. Introduction

The competitiveness of the European and International market for agricultural commodities, has been at the forefront of much debate in recent times in the context of recent reforms to the Common Agricultural Policy (CAP), increasing trade liberalisation brought about as a result of World Trade Organisation (WTO) negotiations, and increasing globalisation of the world economy (Newman and Matthews, 2004). Consequently, the objective of this research was to examine the relative competitiveness of Irish agriculture vis-a-via selected EU and international countries for a baseline period, 1996 to 2004, to provide an insight into the ability of Irish producers to react to the aforementioned influences.

The European Commission's Farm Accountancy Data Network (FADN) was the primary source of data used in the analysis. Data analysis was confined to specialist dairy, sheep, beef finishing, beef fattening and cereal farms, as defined by FADN, on which the standard gross margin from each of the respective enterprises accounted for at least two-thirds of the farm total gross margin. The competitive position of Irish (i) dairy farms was compared against Belgium, Denmark, France, Germany, Italy, the Netherlands and the U; (ii) sheep farms was compared against the UK and France; (iii) beef farms was compared against France, Germany and the UK; and (iv) cereal farms was compared against Denmark, Germany, France, Italy and the UK. Furthermore, additional analysis was conducted on 'representative' beef and dairy farm types from the International Farm Comparisons Network (IFCN), based on a number of major international milk and beef producing countries, to determine the relative international competitiveness of 'representative' Irish specialist milk and beef producers.

The data sources used and methodology involved in the computation of the various indicators of competitiveness used in the analysis are outlined in the following section. The results of the various indicators of competitiveness are then outlined and the conclusions from the research identified.

2. Measurement and Methods

2.1 Farm Accountancy Data Network (FADN)

The Farm Accountancy Data Network (FADN) was the primary source of data used in this analysis. The aim of the network is to gather accountancy data from farms for the determination of incomes and business analysis of agricultural holdings. The concept of the FADN was launched in 1965, when Council Regulation 79/65 established the legal basis for the organisation of the network.

The network consists of an annual survey carried out by the Member States of the European Union. Derived from national surveys, the FADN is the only source of micro-economic data that is harmonised, i.e. the bookkeeping principles are the same in all the countries. The information collected, for each sample farm, for each member country is transmitted by Liaison Agencies (FADN, 2003). Teagasc is the liaison agency for Ireland.

During the period under analysis, the FADN annual sample includes approximately 60,000 holdings. They represented a population of about 4 million farms in the 15 Member States, which covered approximately 90 per cent of the total utilised agricultural area (UAA) and accounted for more than 90 per cent of the total agricultural production of the Union.

FADN data itemises costs on a whole farm basis only, and some method of allocating these costs to the specific enterprises analysed in this research had to be attempted. For the majority of cost items, whole farm costs were allocated to the specific enterprise activity according to the share of specific enterprise output in total farm output. A number of exceptions to this general rule were adopted for individual cost items at the enterprise level and are outlined in further detail in Thorne (2004).

2.1.1 Measurement

The expression of the different indicators of competitive *potential* and *performance* employed in this analysis varies depending on the enterprise examined. However, all the measures of competitiveness used in this report are based on profitability as the leading indicator of competitive *performance*. Boyle (2002) in his analysis of the competitiveness of Irish agriculture said that '*returns and costs matter to competitiveness'* (p.153). Using profitability as an indicator of competitiveness means that both costs and returns are taken into consideration.

For each of the enterprises examined, costs were defined in the following way:

(i) **Total cash costs**, which include all specific costs, directly incurred in the production of a given commodity, for example fertiliser, feedstuffs, seeds etc. plus external costs such as wages, rent and interest paid, plus depreciation charges.

(ii) **Total economic costs**, which includes all of the cash costs identified above, except interest charges, plus imputed resource costs for family labour, equity capital and owned land.

The calculation of total economic costs for the competing countries was one of the most problematic exercises in this analysis. If long-term competitiveness is to be examined the assumptions regarding the measurement of opportunity costs for family labour, owned land and

other non-land capital must be as realistic as possible. The valuation methods adopted for the research in this study are outlined below:

- Family labour was assigned an opportunity cost equal to the cost of hired labour in each of the enterprises studied[i]. The hired labour charge was determined from the FADN data.
- Owned land was assigned an opportunity cost equal to the cost of rented land in each of enterprises studied. The land rental charge was also determined from the FADN data. This approach follows the methodology adopted by Boyle *et al.,* (1992), Boyle (2002), and Fingleton (1995).
- Non-land assets also proved to be a problematic resource for valuation purposes.

Boyle *et al.,* (1992) and Boyle (2002) recommended using a (i) real interest rate which takes into account taxes, subsidies and inflation adjustments and (ii) a depreciation rate. However, Fingleton (1995) recommended using a long-term interest rate, rather than a real inertest (derived from the FADN data) as proposed by Boyle, derived by subtracting the price deflator for private consumption from the nominal long-term interest rates for each country for each relevant year. Both of these approaches were considered but were not adopted for the research. Application of a derived real interest rate substantially increased the spread of rates charged on non-land assets between the countries examined. In addition the application of a long-term interest rate was not considered appropriate given the record of real interest rates over the time period 1996-2003 for Ireland. Due to high inflation in Ireland in this time period, the computed long-term interest rate was negative in some time periods. For this study a nominal interest rate was applied for each of the countries for each relevant year. This approach was considered to provide more realistic opportunity costs for the purpose of valuing non-land assets in this analysis, than the two methods identified above.

In addition to defining the cost variables included in the analysis, it is also important that the returns associated with the individual enterprises are accurately defined. Murphy *et al.,* (2000) outlined the importance of including direct payments in studies which compared inter-country cost and return data. Therefore, the inclusion of direct payments was considered an important issue in this research, given that direct payments were still coupled to production during the period examined.

2.2 International Farm Comparisons Network (IFCN)

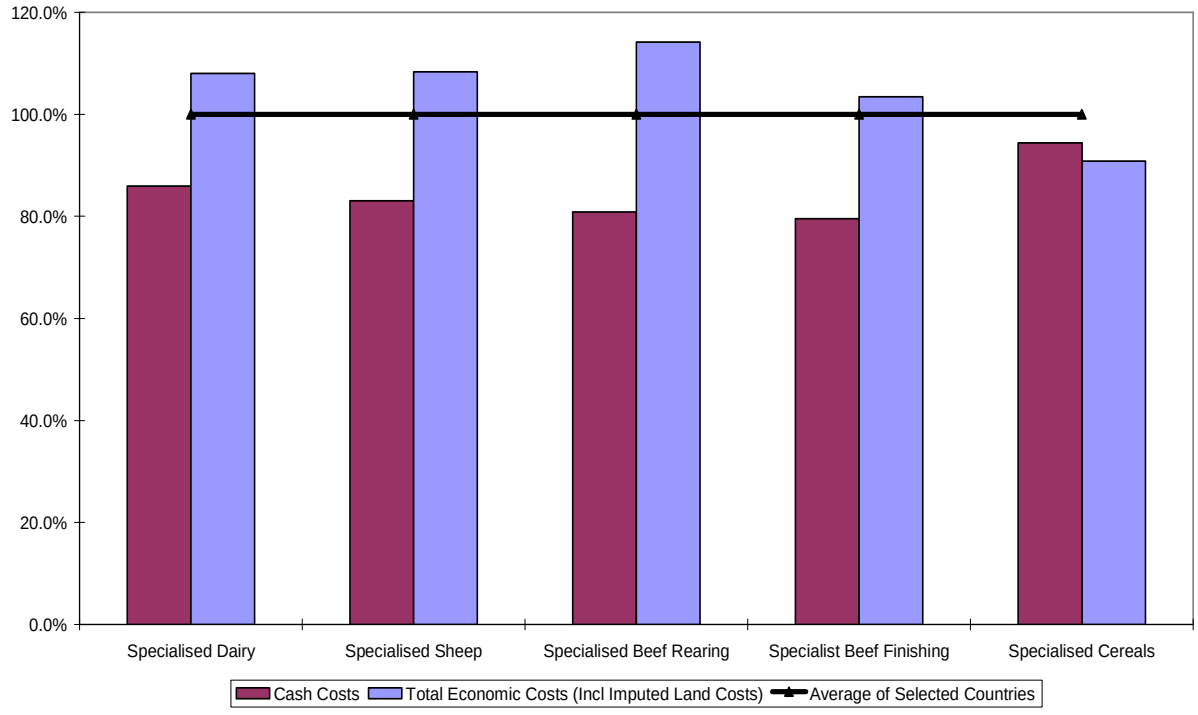
In addition to the comparison of costs within Europe using data from the FADN, international cost competitiveness for dairy and beef production was examined using data from the IFCN (Hemme *et al.,* 2004; DeBlitz *et al.,* 2004). The IFCN is a world-wide partnership that links agricultural researchers, advisors and farmers to create a better understanding of milk production and the costs and returns of production world wide. The cost calculations within the IFCN network are

based on individual representative farms, rather than on the results from stratified random samples of the population as is the case with FADN data. None the less IFCN data provides a source of data which can be used to examine the relative international competitiveness of 'representative' Irish milk and beef producers. Like the methods outlined above, IFCN data also presents costs as total 'cash' costs and total 'economic' costs with opportunity costs calculated for farm-owned factors of production.

3. Results

Figure 1 shows the relative competitive performance of the main sectors of Irish agriculture for the period 1996-2003. The European Commission's Farm Accountancy Data Network (FADN) was the primary source of data used in this analysis. Data analysis was confined to specialist dairy, sheep, beef finishing, beef fattening and cereal farms, as defined by FADN, on which the standard gross margin from each of the respective enterprises accounted for at least two-thirds of the farm total gross margin.

Figure 1 Cash and Economic Costs as a % of Average of Selected Countries, 1996-2003



3.1. Milk Sector

Selected partial productivity measures (milk yield, labour productivity and stocking rate) for Irish dairy herds were generally lower over the period 1996 –2003, compared to the other countries

examined. Furthermore, land productivity measures for Irish farms declined over the period relative to the average of all countries in the analysis.

While partial productivity indicators were worrying for Irish dairy farms, the profitability indicator of competitive performance (costs as a percent of dairy output value) was positive for Ireland over the period 1996 to 2003 compared to the other countries examined. Italy had the lowest cash costs as a percentage of output, but the cost structure in Ireland was only slightly higher. The highest cash costs as a percentage of output were experienced in Denmark where cash costs were 87 per cent of total output of the enterprise. Further analysis of specialist dairy farms that had between 50-99 dairy cows did not show substantial deviation from these results.

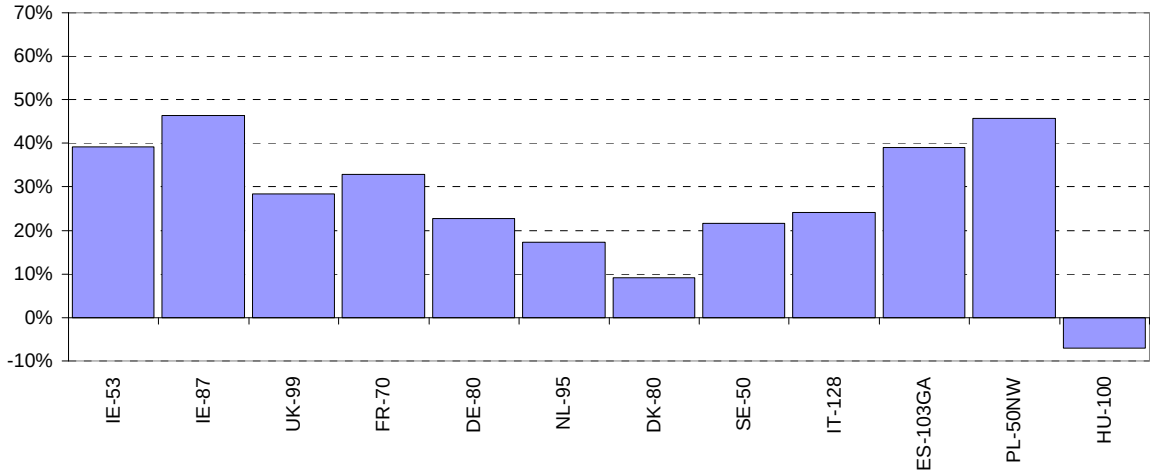
However, the competitive advantage displayed by Irish milk producers deteriorated when total economic costs were considered. Total economic costs as a percentage of output were highest in Ireland for the average size farm at 122 per cent of output. The competitive position of the larger size dairy farms in Ireland was more positive on a total economic cost basis, where total economic costs as a percent of output value was on a par with the average of other countries. The most significant imputed cost that contributed to the relatively high total economic costs experienced in Ireland over the period was the charge for owned land. Thus, the opportunity cost of land has a major impact on the competitive position of Irish milk producers in the long term.

3.1.1 IFCN Results

The comparisons from the IFCN data are presented on a 'two-tiered' basis. The comparisons include results from typical Irish specialist dairy farms of 'average' and 'larger' sizes shown with results from typical dairy farms in ten other EU countries, including two new member states.

In Figure 2 the first measure used for comparison is the profit margin achieved on the whole farm expressed as farm income as a per cent of total returns (output). This measure indicates how well placed typical farms would be if prices or costs moved adversely relative to each other especially in the short to medium term. This measure shows that typical Irish dairy farms appear to have a relatively good position compared to all other countries except for Spain and Poland, which are showing similar results, i.e. from 40 per cent to 46 per cent of all output value was retained as farm income in 2004. In contrast farms in Germany, Netherlands, Denmark and Sweeden are shown to be more exposed to income pressures if milk prices fall and/or costs rise. Typical farms in the UK and France were retaining around 30 per cent with Italy at a lower level.

Figure 2 Profit Margin of the Whole Farm (farm income as per cent of total returns): Ireland v other EU countries (2004)



In Figure 3 the same measure (profit margin) is again used to show how 'typical' Irish dairy farms compare with results which are second tier of important non-EU milk producing countries.

Figure 3 Profit Margin of the Whole Farm (farm income as per cent of total returns): Ireland v other non-EU countries (2004)

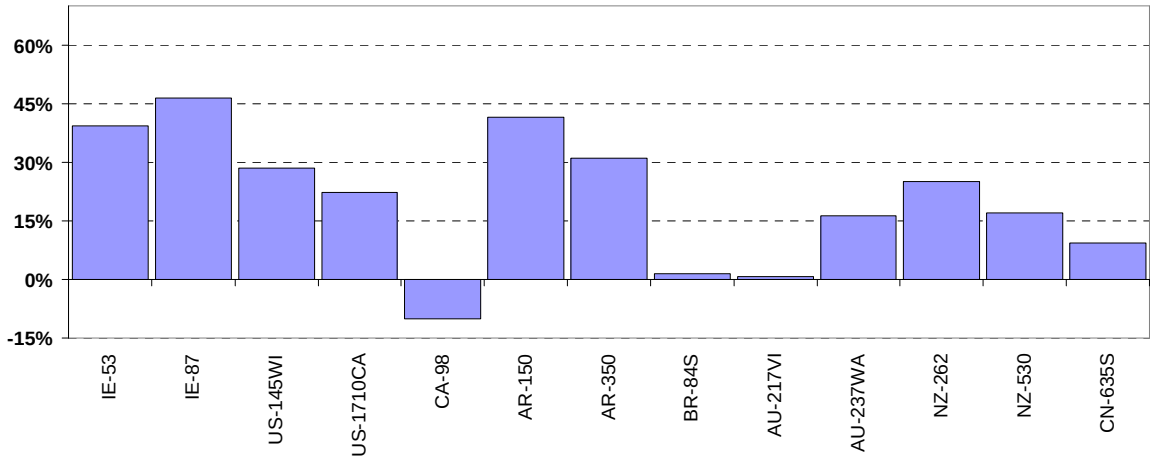


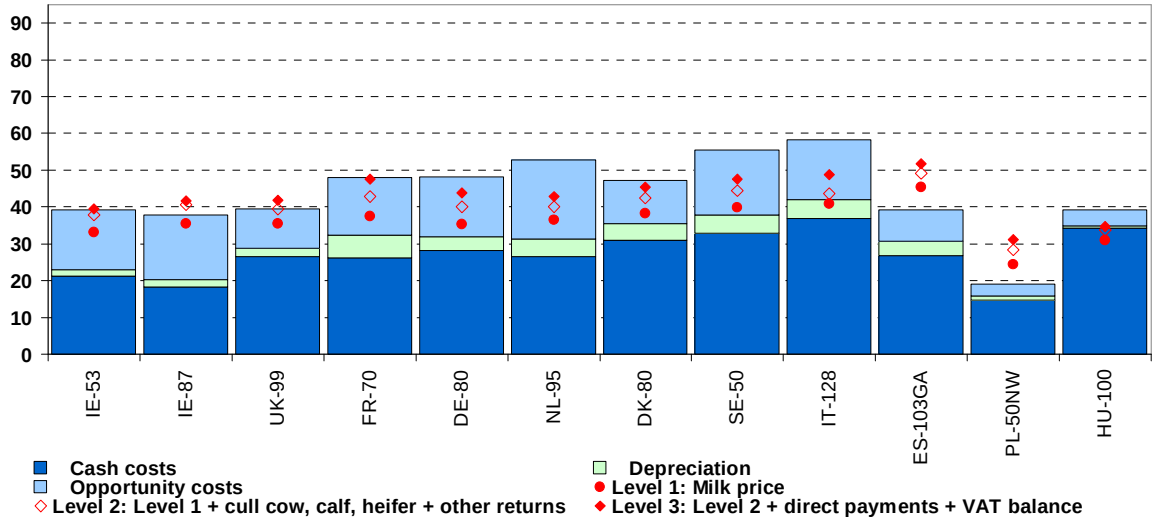
Figure 3 shows that in 2004 at least, the typical Irish farms were also in a relatively strong position compared to most other non-EU dairy countries with only Argentina showing comparable profit margin levels. The typical farm in the US and the typical average size farm in New Zealand were in intermediate positions with from 22 per cent to 28 per cent profit margins. But the results from typical farms in Australia, Brazil, the larger typical farm in New Zealand and in China

were reported having below 20 per cent and some even below 10 per cent profit margins. Therefore, those farms would be more vulnerable to a cost/price squeeze.

The set of comparative results includes measures of total cash costs, depreciation and imputed charges. Also shown are the level of milk prices and other non-milk returns for the dairy enterprise such as calf values and replacement costs. Hence, the following inter-country comparisons shown in Figure 4 and Figure 5 should provide further evidence as to the relative competitive strength of Irish dairying both within the EU and on a broader world wide front. The US dollar was chosen as the common currency measure for all countries results and in both Figures 4 and 5 the y-axis shows all measures expressed on US$ per 100kg milk (ECM)[ii].

Figure 4 shows that in 2004 Irish farms appeared to have relatively low cash costs per 100kg compared to virtually all other EU countries. Poland was the only country with lower unit cash costs in 2004. Spain, the UK, France, Germany, and the Netherlands had more 'intermediate' results, but unit cash costs were at the higher end for farms in Italy, Hungary, Sweeden and Denmark. The addition of depreciation charges did not significantly alter the ranking between countries. However, when total economic costs were measured, the addition of imputed charges tended to push the Irish results closer to several other countries, most notably the UK and Spain. Total economic costs per unit of milk were notably lowest in Poland and also showed a substantial economic margin even with the much lower milk producer prices received in Poland. In all other EU countries, except Spain, total economic costs were in excess of milk prices received and only in Ireland, the UK and in France was the addition of other dairy enterprise returns significant to bring returns equivalent to or slightly exceed total economic costs. There were notable shortfalls between total returns and economic costs still existing in German, Dutch, Sweedish and Italian typical dairy farms.

Figure 4 Total Costs and Returns of the Dairy Enterprise: Ireland v other EU countries (2004)



In Figure 5 the same measures are shown for comparisons between the Irish and non-EU typical dairy farms.

Figure 5 Total Costs and Returns of the Dairy Enterprise: Ireland v other non-EU countries (2004)

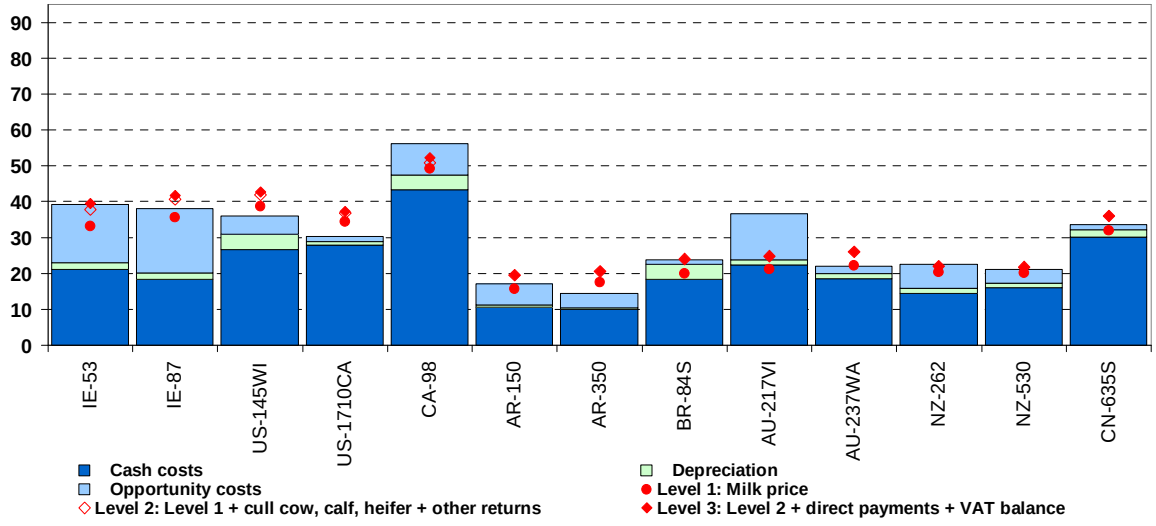


Figure 5 shows that cash costs per unit of milk production are reasonably positive for the Irish farms examined. Canadian dairying was shown to have by far the highest cash costs (and also

the highest total economic costs) and the farms in the US also had relatively high cash costs, whereas the Australian, Brazilian and Irish farms had a similar intermediate level of cash costs. Furthermore, unit cash costs were substantially lower in Argentinean farms and also somewhat lower on the farms in New Zealand. However, Ireland's comparative position deteriorated very substantially when total economic costs were compared. Canada continued in first position with the highest economic costs but the Irish farms occupied the next highest position, with the Australian-Victoria and the US-Wisconsin typical farms at a slightly lower level. Typical farms in Argentina, New Zealand, Brazil and Western Australia exhibited the strongest long term competitive position in 2004. Finally, as in the Irish situation, there were only a few countries where the price of milk was greater than total economic costs per unit. These farms were in the US, Argentina and Western Australia. Perhaps surprisingly given the size of the dairy farms in New Zealand neither the 'average' or 'larger' typical farms could show a positive economic margin over milk price.

3. 2 Beef Sector

Analysis was undertaken on two categories of specialist cattle holdings using FADN data: (1) Specialist cattle – mainly rearing; and (2) Specialist cattle – mainly fattening. Ireland's productivity in these two beef systems was generally lower for the period 1996 –2003 compared to competing beef producers in Europe.

Accountancy indicators for the beef rearing and fattening enterprises (Figure 1) show that over the period 1996 to 2003, Irish producers had a competitive advantage when cash costs were examined. However, the competitive position exhibited by Irish beef farms was much weaker when total economic costs were considered. The imputed charge for owned land and labour had a large influence on the relative competitive advantage of Irish beef farms.

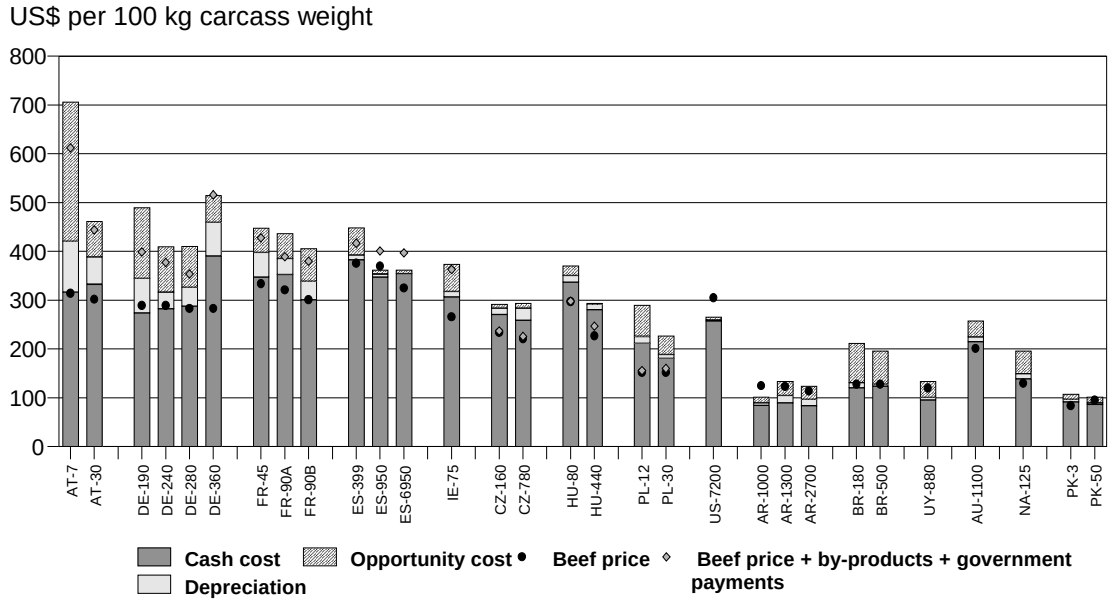
The role of direct payments must be considered in evaluating the longer term competitiveness of Irish beef production systems. To investigate this issue the accountancy based indicators of competitiveness were revisited to determine the ability of Irish cattle farmers to survive in a decoupled policy scenario. For the period 1996 – 2003, Irish beef rearing and fattening farms had on average a 15 per cent and 4 per cent lower cash cost to market based output ratio, respectively, compared to the average of all countries in the analysis. Again, however, Irelands' competitive position deteriorated when economic costs were considered as a percentage of market based output, relative to total output (excluding direct payments).

3.2.1 IFCN Beef Results (2003)

Economic results for the year 2003

In the following, a summary of the economic analysis for the year 2003 is presented. Figures are stated in US$ per 100 kg carcass weight (CW) of beef sold. The costs in Figure 6 are grouped into cash cost, depreciation and opportunity cost for production factors owned by the farmer and his family (labour, land, capital). Returns are stated as a) 'beef returns' on one side and b) 'beef returns plus government payments' on the other side.

Figure 6: Total returns, cost and profitability of beef production 2003



Source: IFCN Beef Report 2004.

Figure 6 shows that in 2003 none of the farms analysed managed to produce beef for less than US$ 100, and the following breakdown of the costs in each of the countries provides an insight into the future competitive position of beef production in the respective countries:

- *Long-term profitability*

The following farms realise an entrepreneur's profit, i.e., covering total cost with the beef price (plus government payments, if there are any): the Spanish farms, the U.S. feedlot (recovered from a heavy loss in last year's comparison) and AR-1000.

- *Medium-term profitability*

Other farms realise a profit from the profit and loss account, i.e., covering cash costs plus depreciation with the returns: all Western European farms except Spain (where farms even make an entrepreneur's profit) – but only with the help of government payments – the Uruguayan farm, the two larger Argentinian farms and the specialised Pakistani farm PK-50, the latter with a very small profit.

- *Short-term profitability*

These are farms that live at the expense of their depreciation, i.e., covering the cash costs but not the depreciation with the returns. In this year's comparison, only the Brazilian farms belong to this group.

- *Unprofitable*

These farms do not even cover their cash costs with the returns: the farms in the Czech Republic, Hungary, Poland, Australia, Namibia and PK-3.

Conclusions for competitiveness

Competitiveness is here defined as the '... sustained ability to profitably gain and maintain market shares' (Martin et al., 1991). Factors influencing profitability are costs and returns. Thus, the comparison of costs and returns of production in agriculture can provide an idea about the competitive situation.

In general, for countries characterised by comparably low costs on the farm level, there is an incentive to export to countries with high costs, if beef prices in the high-cost country are higher than in the low cost country. Low-cost countries would have a favourable competitive situation compared with high cost countries. This is for example the case when comparing the South American farms (low cost, low price) with the Western European farms (high cost, high price).

Assumed that slaughtering and processing costs in all countries are identical, the transport cost from South America to Europe must be added to obtain a comparable cost level. The on-farm cost of production of Argentinian beef (cash cost plus depreciation) is approximately US$ 90–100 per 100 kg CW in-bone. Transport costs on sea from Buenos Aires to Hamburg are between US$ 30–34 per 100 kg carcass weight of de-boned chilled meat at 2003 exchange rates (Imke, 2004). Assuming a share of bones of around 14–16 percent in the carcass, the bone-in cost per 100 kg CW would be approximately US$ 26–30 per 100 kg CW. This results in costs of US$ 116–130 of Argentinian beef compared with costs of around US$ 300 per 100 kg CW for beef (in-bone)

produced in Germany (all figures for 2003). At the same time, price levels in Germany were around US$ 290 per 100 kg CW. At these price-cost relations, there is a strong incentive for Argentina to export beef to Germany and to the European Union, respectively. In the specific German-Argentinian case it can even be assumed that the quality of the Argentinian beef is higher than the German, an issue that would justify higher prices than the average market price mentioned.

Similar observations can be made when comparing South America with the U.S., Australia with the European Union, or some Eastern European farms with Western European farms.

3. 3 Cereals Sector

Selected partial productivity indicators on Irish cereal farms were generally more positive than for the other enterprises examined. Yields were well in excess of the average of all countries examined and labour productivity levels were similar to the average for all countries. Furthermore, there was no consistent relative productivity trend over time observed for Irish cereal farms.

Accountancy measures of competitiveness (Figure 1) indicate that Irish cereal producers maintained a competitive advantage relative to the average of all countries in the analysis, when cash costs and economic costs were considered. For example, Irish cereal producers had the second lowest cash cost: output ratio at 73 per cent, compared to the other countries examined. Even when total economic costs were measured Irish cereal producers maintained a competitive advantage compared to the average of all countries. When direct payments were excluded from the analysis, Irish cereal producers remained competitive during the period 1996 to 2003.

3. 4 Sheep Sector

Selected partial productivity indicators show that Ireland and the UK had relatively low stocking rates and land productivity compared to France over the period 1996 to 2003, but Irish sheep farms had higher technical performance based on these two measures compared to the UK. However, the UK and France both outperformed Ireland in terms of labour productivity.

Accountancy measures (Figure 1) based on cash costs only show that Irish sheep producers have a comparative advantage compared to France and the UK. Irish producers have the lowest cash

costs as a percentage of output and the highest margin over cash costs per 100kg of product volume. However, French producers replaced Irish producers with the highest margin over cash costs per forage hectare. This advantage experienced by French producers in terms of margin over cash costs per hectare can be attributed to the high stocking rate per hectare on French sheep farms, which is associated with intensive indoor feeding of sheep for milk production.

Various measures of cost competitiveness show that Ireland's comparative advantage on a cash cost basis disappeared when economic costs were considered over the period 1996 - 2003. Furthermore, over the period Irish sheep producers relied more heavily on subsides to supplement the revenue of the sheep enterprise, compared to the UK and France. Consequently, when costs were expressed as a percentage of market based output, Irish producers were surpassed by French producers, who had the lowest cash costs as a per cent of market based output. On an economic cost basis Ireland again emerged as the highest cost producer.

4. Conclusions

In summary, it appears that for the period 1996 to 2003/4, the competitive position for Ireland, for all four enterprises: milk, beef, cereals and sheep, was positive when cash costs were considered in isolation from imputed charges for owned resources. The FADN data showed that Irish producers had lower cash costs as a percentage of output, relative to the average of all countries examined, during the period 1996 – 2003. Furthermore, Irish beef rearing, beef fattening, and sheep farms actually appeared as the lowest cash cost producers (as a per cent of output) compared to the other countries examined in the study. However, when cash costs were measured relative to market based output, the competitive position of Irish beef and sheep farms did deteriorate slightly, but still maintained lower costs as a per cent of output relative to the average of all countries. This is an indication of Ireland's competitiveness in the current policy framework where direct payments are decoupled from production. As the opportunity cost of owned resources are not included in this calculation this indication of future competitiveness can only be considered to be valid in the short term. In the longer term adjustment within the sectors will be a reality which will be dependent on relative resource use and in this situation relative resource costs are needed to understand and analyse the adjustment process.

Consequently, imputed charges for owned resources were considered to examine the longer term outlook for the competitiveness of the sectors. In doing so, the competitive ranking for Irish

agriculture slipped relative to the other countries, for all commodities examined. On a total economic cost basis, Irish cereal producers were the only category of farmers that maintained a lower cost (as a percent) of output, relative to the average of all countries. However, when the imputed charge for owned land was excluded from the analysis, all categories, except sheep and beef finishing farms, maintained a lower cost position, relative to the average of all countries.

The deterioration of Ireland's competitive position relative to the other countries examined as the unit of measurement changes from cash costs to total economic costs has also been demonstrated by Thorne (2004) and Boyle (2002). A number of factors are important in explaining this deterioration. Boyle (2002) concluded that part of this explanation relates to '*the relatively low scale of primary agricultural activity in Ireland*' (p.177). In this particular study the examination of scale economics was not possible for all commodities due to data availability issues. However a sub sample of larger dairy farms using FADN data and the IFCN data did facilitate the effect of economics of scale in the dairy sector. This analysis showed that whilst the competitive ranking of the countries remained unchanged the magnitude of the differences was much less in this sub sample of farms compared to the national averages. In particular, economic costs on these larger Irish dairy farms were substantially reduced compared to the national average. This result is indicative of the small scale farming that is predominant in the Irish dairy industry relative to competing industries. Furthermore, it could be concluded that larger scale producers in Ireland will be in a superior competitive position relative to the smaller scale producers in the long run, due to their ability to cope with a cost/price squeeze, given current projections for a decline in farm milk prices.

The results of this study provide a baseline position against which the change in competitiveness of Irish agriculture can be measured. This is an important development in the process of monitoring the position of Irish agriculture relative to other EU countries. EU enlargement, trade liberalisation in the context of WTO negotiations and impending reform of the CAP will all have major influences on the competitive position of Irish agriculture, which can be monitored against the baseline position outlined by this research.

References

Boyle, G.E, Kearney, B, McCarthy, T., and Keane, M. (1992) *The Competitiveness of Irish Agriculture,* Allied Irish Banks and the Irish Farmers Journal, Dublin 1992.

Boyle, G.E. (2002) *The Competitiveness of Irish Agriculture, Report for the Department of Agriculture and Food*, The Irish Farmers Journal, Dublin.

Deblitz C, Izquierdo-Lopez MD, Davier Z von (eds) (2004)[online] IFCN Beef Report 2004 : for a better understanding of beef farming world-wide. Braunschweig : FAL, 107 <http://www.ifcnnetwork.org> [accessed 30th November 2004]

FADN (2003) Farm Accountancy Data Network,

<< http://europa.eu.int/comm/agriculture/rica/index_en.cfm>> [[accessed 12th August 2003]]

Fingleton, W.A. (1995) 'Comparative Costs and Returns for milk production in EU countries', paper presented at the *Annual Conference of the Agricultural Economics Society of Ireland*, Dublin, October 1995.

Hemme Torsten, Karin Christoffers and Eve Deekon (Editors): IFCN Dairy Report (2004), International Farm Comparisosn Netwrok, Global Farm GbR, Braunschweig.

Martin, L., Westgren, R., and van Durren, E. (1991) "Agribusiness Competitiveness across National Boundaries" *The American Journal of Agricultural Economics",* December, pp.1456-1464.

Murphy, H., Dunne, W., and Connell, J.J. (2000*) The Economics of Beef Production in Ireland, France and Germany*, Teagasc, Rural Economy Research Series, no. 7.

Newman, C. and Matthews, A., 2004. Measuring and Understanding Productivity Growth in Irish Agriculture. *Wissenschaftsverlag Vauk, Kiel.*

Thorne, F. (2004) *Measuring the Competitiveness of Irish Agriculture (1996-2000)* Rural Economy Research Series, Teagasc, Dublin, ISBN 1 84170 373 7.

Associated Publications

Claus, Thorne, F. and et al. (2004). Status quo and prospects for beef produciton world wide (Landbauforschung Volkenrode) 4/2004 (54): 237-249. World Wide Web (Internet)

Thorne, F. and Fingleton, W.A. (2005). Irish Dairy Farming - Can We Compete?. In: Teagasc National Dairy Conference, Slieve Russell Hotel, 17-Nov-2005, 1

Thorne, F. and Fingleton, W.A. (2005). Irish Dairy Farming – Can We Compete?. In: Teagasc, National Dairy Conference, McEniff Ard Ri Hotel, Ferryban, 16-Nov-2006, pp.10-24

Thorne, F. (2005). Analsyis of the Competitiveness of Cereal Production in Selected EU Countries. In: EAAE Copenhagen 2005, Copenhaegn, Denmark, 26-Aug-2005, 16 pages

Thorne, F. (2005). Examining the Competitiveness of Cereal Production in EU Countries. Journal of Farm Management , pp. 313-328

Thorne, F. (2005). The Competitiveness of Irish Agriculture (1996-2000). In: Agricultural Research Forum 2005, Tullamore Court Hotel, Tullamore, 15-Mar-2005, p.50

Thorne, F. (2006). Examining the Relative Competitiveness of Milk Production: An Irish Case Study (1996 – 2004). In: Uk Ag. Economics Society Conference, Paris, 31-Mar-2006, 24 pages

Thorne, F. (2006). Examining the Relative Competitiveness of Milk Production: An Irish Case Study (1996 – 2004). In: Competitiveness in Agriculture and in the Food Industry: US and EU perspectives" (EAAE Conference), Bologna, 15-Jun-2006, 15 pages

Thorne, F. and Fingleton, W.A. (2006). Examining the Relative Competitiveness of Milk Production: An Irish Case Study (1996 - 2004). Journal of International Farm Management 13pp ISSN 1816-

[i] The determination of an appropriate opportunity cost for own family labour is always an issue in studies which examine costs of production on family farms. The use of the average agricultural wage to value owned family labour may in some instances over value (due to under employment) or under value (due to managerial or entrepreneurial ability) this resource. However, without any further evidence to suggest in which cases such situations arise the average agricultural wage is used in the absence of this additional information.

[ii] ECM shows that each countries milk prices have been standardised for fat and protein.