



**An Roinn Talmhaíochta,
Bia agus Mara**
Department of Agriculture,
Food and the Marine

Research Stimulus Fund

Final Report

*'Measurement and Understanding of the International Competitiveness of Irish Agriculture -
MetricComp'*

DAFM Project Reference No: 14/S/874

Start date: 01/03/2015

End Date: 30/06/2017

Principal Coordinator and Institution: Dr. Fiona Thorne, Teagasc

Email: fiona.thorne@teagasc.ie

Collaborating Research Institutions and Researchers: UCD, Dr. Doris Laepple

Please place one "x" below in the appropriate area on the research continuum where you feel this project fits

Basic/Fundamental	→	Applied	→	Pre Commercial		
1	2	3X	4	5	6	7

Please specify priority area(s) of research this project relates to from the National Prioritisation Research Exercise* (NRPE) report;

Priority Area (s)	I Sustainable Food Production and Processing
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Key words: *Competiveness, Innovation, Farm Economics*

1. Rationale for Undertaking the Research

In parallel with developments at multilateral and bilateral trade negotiations, the EU has since the mid-1980s been engaged in a rolling process of Common Agricultural Policy (CAP) reform. In all of the major CAP reforms since the mid-1980s, the European Commission has stressed the need to tailor European agricultural policy to enhance the competitiveness of EU agriculture.

Thus, given the continuing pressures for agricultural policy reform within the EU and the continuing trend towards less trade and price-distorting agricultural income support systems, the relative costs and efficiency of production for the major internationally traded commodities will assume greater importance. The ability of Irish farms to stay in business and grow will depend increasingly on their capacity to sustain profitability from participating in the European and global marketplace, rather than their ability to draw on support policies.

The objective of this study was to measure the competitiveness of Irish agriculture for the major agricultural commodities of relevance to Ireland and to measure Irish agriculture's competitive position relative to a range of the main producing and exporting countries. In this way we generated information about the competitive strengths and weaknesses of Irish agriculture in a European and global context and gained insights into the capacity of the sector and its sub-components to survive and prosper in an environment of freer trade and diminished protectionism. This objective of measuring and understanding the international competitiveness was explicitly stated in the FH2020 document (DAFF, 2010) which highlighted the measurement of competitiveness as a research priority for Teagasc.

In terms of the research contributing to identified needs of end users, the competitive performance indicators examined in this research will facilitate the regular monitoring of the competitiveness of Irish agriculture, which enables policy makers in the Department of Agriculture, Food and the Marine (DAFM) to monitor progress in the achievement of policy objectives. Furthermore, the examination of the sources of competitive performance contributes to informed policy making by deepening the understanding of the sources and determinants of the international competitiveness of Irish agriculture, in particular, the role of innovation.

2. Research Approach

To begin with a comprehensive review of the international literature on competitiveness indicators pertaining to the agricultural sector was carried out. This literature was used to guide the development of competitiveness indicators and the selection of appropriate empirical methods to examine the sources of competitive performance (potential and process).

Following the comprehensive literature review and development of a conceptual framework, research was carried out on the examination of the competitive performance of the main sectors of Irish agriculture, with aggregate and distributional results for a sub set of EU dairy, beef, sheep and cereal producing countries for a time series of data from 2011 to 2015. A computerised system for updating data for the sectors within the EU using data from the European Commission's Farm Accountancy Data Network (FADN) has been established. Outside the EU, the International Farm Comparisons Network (IFCN) for dairy and the Agribenchmark for beef, sheep and cereals were utilised to provide data on the international competitiveness of the aforementioned sectors, for the accounting years 2014, 2015 and 2016.

An econometric analysis of the link between innovation and competitive performance was conducted. Data from the Teagasc, National Farm Survey (NFS), was used in this analysis, which adopted a generalised propensity score matching approach to determine if there was a significant difference in economic sustainability between different farms classified based on an innovation index for Irish farming.

The final empirical task of the project involved the use of the FAPRI-Ireland farm level policy modelling framework to assess how competitiveness may evolve in the future under baseline and alternative policy scenarios. Involvement with stakeholders was incorporated through the Teagasc Brexit working group, given that the project participants considered a Brexit scenario to be one of the most useful policy scenarios to consider given the current policy environment. . The definition of the scenario to be examined was guided by the working group and defined as a Brexit scenario whereby a Trade Liberalisation (TL) policy is to be adopted by the UK, in which the UK reduces tariff rates by 50% across the board.

3. Research Achievements/Results

A detailed report and analysis of trends in the competitiveness of the main sectors in Irish agriculture was published in April 2017. The report was launched as part of a workshop on competitiveness and efficiency measurement and aimed at stakeholders within the industry.

Profitability, costs of production, value of output and some partial productivity indicators (such as milk yield, stocking density, cereal yield, labour productivity) were examined. The analysis confirmed the competitive advantage associated with the Irish dairy farm system in particular. Irish dairy farms continue to exhibit relatively low cash costs of production when we compare ourselves against key EU and international competitors. For recent years, cash cost in Ireland were one of the lowest amongst the key EU dairy producing regions, at €2.7 per kg of milk solids, which was substantially lower than countries such as the UK, France, the Netherlands, Germany and Denmark. This latest research shows that based on a total cost competitiveness index, we are finally beginning to see our total economic costs reduce in an international context, due to increases in scale.

In relation to the other main sectors in Irish agriculture, by using profitability as a leading indicator of competitive performance, the inter-EU analysis carried out illustrated the importance of decoupled payments for Irish farmers, with the beef and sheep sectors in particular exhibiting higher cash costs as a per cent of market based output compared to key EU counterparts. Furthermore, one of the implications of the findings is suggestive of the potential hard hitting impact Brexit could have for Irish beef farms. The analysis has shown that relatively high cash and total economic costs of production are evident for Irish beef, with costs much lower in regions such as Brazil and Argentina. This could have profound implications on the competitiveness of Irish beef on UK markets in a more liberalised trade environment post Brexit.

This empirical analysis of the impact of innovation on economic sustainability on Irish dairy farms, revealed that innovation increases economic sustainability, but not in a linear way. More specifically, economic gains depend on the level of innovation. Small efforts to increase innovation can lead to economic gains of over €200 per hectare. The results also reveal that innovative farmers can achieve higher economic gains by innovating further.

4. Impact of the Research

The benefits of the research to the end user are as follows:

- (1) The computerised system for updating data necessary for the computation of competitive performance indicators for the sectors within the EU using data from the European Commission's Farm Accountancy Data Network (FADN) has been established. This system facilitates the regular monitoring of the competitiveness of Irish agriculture, which enables policy makers in the Department of Agriculture, Food and the Marine (DAFM) to monitor progress in the achievement of policy objectives;
- (2) The scenario analysis conducted as part of the competitive performance analysis has indicated the potential hard hitting impact Brexit could have for Irish beef farms, with implications for a wide range of end users of the research, including upstream and downstream industry, consumers, regulatory authorities, policy makers and the scientific community. .
- (3) The empirical analysis of the sources of competitive performance within Irish agriculture contributes to informed policy making by deepening the understanding of the sources and determinants of the international competitiveness of Irish agriculture. In particular, the findings support the current focus of the Irish extension system on fostering the uptake of innovative technologies and practices in order to achieve an economically sustainable expansion of the dairy sector.

4(a) Summary of Research Outcomes

- (i) Collaborative links developed during this research

Four new collaborative links were developed during the research project life time relating to competitive performance measurement:

- .The University of Dundee, UK

- University of Wisconsin - Madison, US
- UCC
- University of Lincoln, NZ

(ii) Outcomes where new products, technologies and processes were developed and/or adopted

The competitive performance indicators for Irish agriculture using FADN data, computed in this project, do not use new methods, however what is new about the research is the research results which provide an up to date position on the competitive performance of Irish agriculture, with timely policy relevant findings. For example, the decrease in economic costs per unit of milk produced in a comparative EU context, post quota elimination is an example of timely policy relevant research output.

The novelty in terms of the analytical approach measuring competitive performance in this project related to approaches developed which allow for the routine calculation of competitiveness indicators using the FADN Standard results and the estimation of the indicators for the most recent years using Eurostat price and production indices. Previously when competitiveness indicators were produced for certain sub sectors of Irish agriculture, as a consequence of the nature of the data used to construct the indicators, they tended to be time lagged in nature.

Prior to this research project the focus of competitiveness measurement within the agricultural sector from an Irish perspective has been on quantitative indicators of competitive performance and potential. However, this research provided a new departure whereby an empirical examination was carried out on the role of innovation as an indicator of the competitive process, which is the mechanism whereby competitive potential is translated into competitive performance.

(iii) Outcomes with economic potential

The indicators of competitive performance confirmed the competitive advantage associated with the Irish dairy farm system in particular. Irish dairy farms continue to exhibit relatively low cash costs of production when we compare ourselves against key EU and international competitors. For recent years, cash cost in Ireland were one of the lowest amongst the key EU dairy producing regions, at €2.7 per kg of milk solids, which was substantially lower than countries such as the UK, France, the Netherlands, Germany and Denmark. This latest research shows that based on a total cost competitiveness index, we are finally beginning to see our total economic costs reduce in an international context, due to increases in scale.

(iv) Outcomes with national/ policy/social/environmental potential

Based on the distributional analysis of competitive performance, for farms of different sizes, the ability of the larger Irish dairy farms to compete in the longer term in a global context was affirmed. Furthermore, as Irish dairy farming transforms to larger scale production in a no quota environment, the Irish milk sectors competitive position will be

strengthened further. Our analysis of the competitive process, with a focus on innovation, has shown that innovation increases economic performance on all farms.

By using profitability as a leading indicator of competitive performance, the inter-EU analysis carried out illustrated the importance of decoupled payments for Irish farmers, with the beef and sheep sectors in particular exhibiting higher cash costs as a percent of market based output compared to key EU counterparts. Hence, the importance of non-market based returns in the viability of the Irish drystock sector was demonstrated.

Furthermore, when economic costs were considered, one of the implications of the current study is the potential hard hitting impact Brexit could have for Irish beef farms. The analysis has shown that relatively high cash and total economic costs of production are evident for Irish beef, with costs much lower in regions such as Brazil and Argentina. This could have profound implications on the competitiveness of Irish beef on UK markets in a more liberalised trade environment post Brexit.

4 (b) Summary of Research Outputs

(i) Peer-reviewed publications, International Journal/Book chapters.

Laepple, D., and Thorne, F. (2019) The Role of Innovation in Farm Economic Sustainability: Generalised Propensity Score Evidence from Irish Dairy Farms *Journal of Agricultural Economics*, [Volume 70, Issue 1](#), February 2019, Pages 178-197

(ii) Popular non-scientific publications and abstracts including those presented at conferences

Gillepsie, P. and Thorne, F. (2016) An automated framework for assessing dairy competitiveness, AESI Annual Conference, Dublin, 7/1/2016

Gillepsie, P. and Thorne, F. (2016) "Assessing dairy cost competitiveness in a global marketplace" at AES Annual Conference in Warwick, UK.

(iii) National Report

Thorne et al (2017) Competitiveness of Irish Agriculture, <https://www.teagasc.ie/media/website/publications/2017/The-Competitiveness-of-Irish-Agriculture.pdf>

(iv) Workshops/seminars at which results were presented

Thorne, F., McCormack, M., Gillespie, P., and Cillero, M. (2017) Competitiveness and Productivity in Agriculture, Seminar in the RDS, April 2017, Organised international workshop 24/04/17

Thorne, F., McCormack, M., Gillespie, P., and Cillero, M. (2018) 'Competitiveness of Irish Agriculture' HLIC FoodWise Presentation, 01/06/18

Thorne, F., McCormack, M., Gillespie, P., and Cillero, M. (2018) Competitiveness and Productivity of Irish beef production, - Teagasc/SRUC event, Edinburgh, Jan. 2018

Thorne, F., McCormack, M., Gillespie, P., and Cillero, M. (2018) Present 'Competitiveness of Irish Agriculture' Alltech conference, Dunboyne, Meath 16/10/18

Gillespie, P. and Thorne, F. (2016) Outlook 2017 (December 2016) Present Competitiveness findings to conference 02/12/16

Thorne, F. and Gillespie, P. (2017) Outlook 2018, Competitiveness of Irish Agriculture, Present Competitiveness findings to conference 04/12/17

(v) Intellectual Property applications/licences/patents

(vi) Other

5. Scientists trained by Project

Total Number of PhD theses: NA

Total Number of Masters theses: NA

6. Permanent Researchers

Institution Name	Number of Permanent staff contributing to project	Total Time contribution (person years)
Teagasc	4	.5
UCD	2	.35
Total	6	.85

7. Researchers Funded by DAFM

Type of Researcher	Number	Total Time contribution (person years)
Post Doctorates/Contract Researchers	2	2.7
PhD students		
Masters students		
Temporary researchers		
Other		
Total	2	2.7

8. Involvement in Agri Food Graduate Development Programme

Name of Postgraduate / contract researcher	Names and Dates of modules attended
Patrick Gillespie	Management and Leadership (18/11/2015) Supervision skills (22/10/2016) Working smarter and better (20/1/2016) Teagasc Induction (18/2/2016) Advanced Scientific Writing and Presentation skills (11/3/2016)
Oltion Preka	Innovation for Food Business, MSc, UCD

9. Project Expenditure

Total expenditure of the project: €179,539.60

Total Award by DAFM: €194,745.83

Other sources of funding including benefit in kind and/or cash contribution(specify): €NA

Breakdown of Total Expenditure

Category	Teagasc	UCD	Total
Contract staff			
Temporary staff			
Post doctorates	62702.74	51430.24	114132.98
Post graduates			
Consumables			
Travel and subsistence	9255.60	3741.92	12998.52
Sub total	71958.34	55172.16	127130.50
Durable equipment			
Other	20128.32	498.15	20626.47
Overheads	17989.59	13793.04	31782.63
Total	110076.25	69463.35	179539.60

10. Leveraging

In terms of skills leveraging, the collaboration between Teagasc and UCD initiated by this project, assisted in developing a new joint area of research between the project participants. More specifically, this collaboration furthered research interests in the area of innovation and competitive performance. This resulted in two PhDs in the area of innovation and competitive performance.

1. Teagasc Walsh Fellowship, €88,000. Innovation and Productivity in Irish Dairy Farming, UCD
2. Teagasc, NUIG, University of Madison collaboration on PhD examining the productivity of Irish dairying post quota abolition

11. Future Strategies

It is expected that the competitive performance indicators constructed as part of this project will be updated on a regular basis in the future with FADN, IFCN and Agribencehmark data.

A new PhD will begin in September 2019, in conjunction with Teagasc, UCC and Lincoln University in NZ, to continue work on the competitiveness of the Irish agri-food supply chain.

12. Consent to Publish Final Report on the DAFM Website and/or Through Other Dissemination channels

I consent to this report being made available to the public, through the Department's website and other dissemination channels.

Yes No

13. Declaration

I declare that the information contained in this final report is complete and true to the best of my knowledge and belief.

Signed:  Project Coordinator

Date: 30/5/2019